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P-A STACKS

August 1977 Number 396-Part I

SEP 27 1977

# Solar-Geophysical Data prompt reports

Data for July 1977–June 1977

Explanation of Data Reports Issued as Number 390 (Supplement) February 1977

noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / ENVIRONMENTAL DATA SERVICE / ASHEVILLE, N.C.

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# Solar - Geophysical Data

NO. 396 AUGUST 1977

## Part I (Prompt Reports)

DATA FOR
JULY 1977
JUNE 1977

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
BOULDER, COLORADO

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# SOLAR - GEOPHYSICAL DATA

No. 396

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Director
Solar - Terrestrial Data Services Division

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Note: A = Part I, B = Part II.

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# ALERT PERIODS

## INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

### JULY 1977

SUMMARY OF THE GEOALERT WWA MESSAGES

| Message serial number | Date of issue | Date of observation | Wolf number | 10 cm solar flux | A index | Active Regions: Location Lat-Long | Active Regions: No. of Flares: Total | Active Regions: No. of Flares: M | Active Regions: No. of Flares: X | Outstanding events | Forecasts: Date | Forecasts: Location Lat-Long | Forecasts: Desc* | Alert Situations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 182 | 1 | 30 | 42 | 103 | 07 | S20W80 | 0 | 0 | 0 | | 1 | S20W80 | Q | SOLQUIET MAGQUIET |
| | | | | | | N16W17 | 0 | 0 | 0 | | | N16W17 | Q | |
| 183 | 2 | 01 | 70 | 99 | 20 | N16W28 | 0 | 0 | 0 | | 2 | N16W28 | Q | SOLQUIET MAGQUIET |
| 184 | 3 | 02 | 48 | 97 | 10 | N16W41 | 0 | 0 | 0 | | 3 | N16W41 | Q | SOLQUIET MAGQUIET |
| | | | | | | N39W29 | 0 | 0 | 0 | | | N39W29 | Q | |
| | | | | | | N18E72 | 0 | 0 | 0 | | | N18E72 | Q | |
| 185 | 4 | 03 | 51 | 90 | 05 | N16W57 | 0 | 0 | 0 | | 4 | N16W57 | Q | SOLQUIET MAGQUIET |
| | | | | | | N39W45 | 0 | 0 | 0 | | | N39W45 | Q | |
| | | | | | | N20E59 | 0 | 0 | 0 | | | N20E59 | Q | |
| 186 | 5 | 04 | 64 | 91 | 10 | N13W69 | 0 | 0 | 0 | | 5 | N13W69 | Q | SOLQUIET MAGQUIET |
| | | | | | | N38W56 | 0 | 0 | 0 | | | N38W56 | Q | |
| | | | | | | N19E44 | 0 | 0 | 0 | | | N19E44 | Q | |
| | | | | | | S19E80 | 0 | 0 | 0 | | | S19E80 | Q | |
| 187 | 6 | 05 | 53 | 87 | 05 | N15W84 | 0 | 0 | 0 | | 6 | N15W84 | Q | SOLQUIET MAGQUIET |
| | | | | | | N39W68 | 0 | 0 | 0 | | | N39W68 | Q | |
| | | | | | | N20E30 | 0 | 0 | 0 | | | N20E30 | Q | |
| | | | | | | S19E63 | 0 | 0 | 0 | | | S19E63 | Q | |
| 188 | 7 | 06 | 42 | 87 | 17 | N39W79 | 0 | 0 | 0 | | 7 | N39W79 | Q | SOLQUIET MAGQUIET |
| | | | | | | S21E49 | 0 | 0 | 0 | | | S21E49 | Q | |
| | | | | | | N21W42 | 0 | 0 | 0 | | | N21W42 | Q | |
| 189 | 8 | 07 | 24 | 82 | 17 | N20W58 | 0 | 0 | 0 | | 8 | N20W58 | Q | SOLQUIET MAGALERT MINOR 07/07 |
| | | | | | | S19E36 | 0 | 0 | 0 | | | S19E36 | Q | |
| 190 | 9 | 08 | 28 | 79 | 12 | N21W69 | 1 | 0 | 0 | | 9 | N21W69 | Q | SOLQUIET MAGNIL |
| | | | | | | S20E21 | 0 | 0 | 0 | | | S20E21 | Q | |
| 191 | 10 | 09 | 22 | 76 | 14 | N19W83 | 0 | 0 | 0 | | 10 | N19W83 | Q | SOLQUIET MAGQUIET |
| | | | | | | S19E09 | 0 | 0 | 0 | | | S19E09 | Q | |
| 192 | 11 | 10 | 13 | 74 | 13 | S19W01 | 1 | 0 | 0 | | 11 | S19W01 | Q | SOLQUIET MAGQUIET |
| 193 | 12 | 11 | 13 | 74 | 13 | S19W15 | 0 | 0 | 0 | | 12 | S19W15 | Q | SOLQUIET MAGQUIET |
| 194 | 13 | 12 | 13 | 73 | 05 | S20W24 | 1 | 0 | 0 | | 13 | S20W24 | Q | SOLQUIET MAGQUIET |
| 195 | 14 | 13 | 16 | 75 | 11 | S21W39 | 1 | 0 | 0 | | 14 | S21W39 | Q | SOLQUIET MAGQUIET |
| 196 | 15 | 14 | 00 | 74 | 23 | - | - | - | - | | 15 | SPOTNIL | | SOLQUIET MAGQUIET |
| 197 | 16 | 15 | 00 | 74 | 12 | - | - | - | - | | 16 | SPOTNIL | | SOLQUIET MAGQUIET |
| 198 | 17 | 16 | 00 | 74 | 15 | - | - | - | - | | 17 | SPOTNIL | | SOLQUIET MAGQUIET |
| 199 | 18 | 17 | 00 | 74 | 10 | - | - | - | - | | 18 | SPOTNIL | | SOLQUIET MAGQUIET |
| 200 | 19 | 18 | 00 | 74 | 11 | - | - | - | - | | 19 | SPOTNIL | | SOLQUIET MAGQUIET |
| 201 | 20 | 19 | 23 | 74 | 19 | S26W27 | 0 | 0 | 0 | A C-8 X-RAY EVENT STARTED ABOUT 19/2242Z; AN EPL** WAS OBSERVED AT N35E90, MAX AT 19/2330Z | 20 | S26W27 | Q | SOLQUIET MAGQUIET |
| | | | | | | N20E56 | 0 | 0 | 0 | | | N20E56 | Q | |
| 202 | 21 | 20 | 23 | 77 | 28 | N17E76 | 0 | 0 | 0 | | 21 | N17E76 | Q | SOLQUIET MAGALERT |
| | | | | | | N16E29 | 0 | 0 | 0 | | | N16E29 | Q | |
| 203 | 22 | 21 | 11 | 79 | 15 | N16E64 | 0 | 0 | 0 | | 22 | N16E64 | Q | SOLQUIET MAGALERT MINOR 22/24 |
| 204 | 23 | 22 | 37 | 80 | 14 | N19E12 | 0 | 0 | 0 | | 23 | N19E12 | Q | SOLQUIET MAGALERT MINOR 23 |
| | | | | | | N15E52 | 0 | 0 | 0 | | | N15E52 | Q | |
| 205 | 24 | 23 | 53 | 82 | 08 | N19W00 | 0 | 0 | 0 | | 24 | N19W00 | Q | SOLQUIET MAGNIL |
| | | | | | | N15E36 | 0 | 0 | 0 | | | N15E36 | Q | |
| | | | | | | S24E52 | 1 | 0 | 0 | | | S24E52 | Q | |
| | | | | | | N20W60 | 0 | 0 | 0 | | | N20W60 | Q | |
| 206 | 25 | 24 | 32 | 81 | 05 | N17E26 | 0 | 0 | 0 | | 25 | N17E26 | Q | SOLQUIET MAGQUIET |
| | | | | | | S23E42 | 0 | 0 | 0 | | | S23E42 | Q | |
| 207 | 26 | 25 | 45 | 83 | 05 | N20W28 | 0 | 0 | 0 | | 26 | N20W28 | Q | SOLQUIET MAGQUIET |
| | | | | | | N19E12 | 0 | 0 | 0 | | | N19E12 | Q | |
| | | | | | | S23E28 | 0 | 0 | 0 | | | S23E28 | Q | |
| 208 | 27 | 26 | 54 | 83 | 05 | N19W41 | 0 | 0 | 0 | | 27 | N19W41 | Q | SOLQUIET MAGQUIET |
| | | | | | | N19W00 | 0 | 0 | 0 | | | N19W00 | Q | |
| | | | | | | S23E13 | 0 | 0 | 0 | | | S23E13 | Q | |
| | | | | | | S30W11 | 0 | 0 | 0 | | | S30W11 | Q | |
| 209 | 28 | 27 | 39 | 83 | 05 | N20W55 | 1 | 0 | 0 | | 28 | N20W55 | Q | SOLQUIET MAGQUIET |
| | | | | | | N16W12 | 0 | 0 | 0 | | | N16W12 | Q | |
| | | | | | | S24E00 | 0 | 0 | 0 | | | S24E00 | Q | |
| 210 | 29 | 28 | 26 | 85 | 05 | N20W69 | 0 | 0 | 0 | SUDDEN COMMENCEMENT OBSERVED AT BOULDER AT 29/0027Z | 29 | N20W69 | Q | SOLQUIET MAGQUIET |
| | | | | | | N15W26 | 0 | 0 | 0 | | | N15W26 | Q | |
| 211 | 30 | 29 | 23 | 84 | 49 | N21W84 | 0 | 0 | 0 | | 30 | N21W84 | Q | SOLQUIET MAGALERT 30/30 |
| | | | | | | N17W39 | 0 | 0 | 0 | | | N17W39 | Q | |
| 212 | 31 | 30 | 11 | 82 | 28 | N16W53 | 0 | 0 | 0 | | 31 | N16W53 | Q | SOLQUIET MAGNIL |
| 213 | 01 | 31 | 23 | 78 | 10 | S19W53 | 0 | 0 | 0 | | 01 | S19W53 | Q | SOLQUIET MAGQUIET |
| | | | | | | N28W36 | 0 | 0 | 0 | | | N28W36 | Q | |

* Q=Quiet E=Eruptive A=Active P=Proton C=Caution D=Doubtful O.G.=Other Groups MF=Major Flare
** EPL = Eruptive prominence on the solar limb.

# RELATIVE SUNSPOT NUMBERS

## ZURICH, $R_Z$

| | 1976 FINAL | | | | | 1977 PROVISIONAL | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL |
| 1 | 10 | 17 | 30 | 8 | 0 | 20 | 15 | 0 | 7 | 15 | 44 | 42 |
| 2 | 16 | 20 | 28 | 0 | 0 | 32 | 19 | 8 | 11 | 14 | 43 | 45 |
| 3 | 17 | 12 | 34 | 0 | 0 | 25 | 19 | 8 | 10 | 22 | 43 | 42 |
| 4 | 13 | 11 | 30 | 0 | 0 | 22 | 16 | 8 | 7 | 23 | 49 | 39 |
| 5 | 16 | 17 | 25 | 0 | 0 | 21 | 18 | 8 | 7 | 16 | 48 | 40 |
| 6 | 14 | 18 | 24 | 0 | 0 | 13 | 7 | 9 | 8 | 16 | 33 | 40 |
| 7 | 24 | 9 | 30 | 0 | 7 | 0 | 7 | 8 | 7 | 12 | 41 | 25 |
| 8 | 27 | 9 | 7 | 0 | 19 | 0 | 26 | 20 | 0 | 19 | 38 | 20 |
| 9 | 31 | 18 | 14 | 0 | 22 | 0 | 21 | 20 | 0 | 25 | 33 | 17 |
| 10 | 24 | 22 | 0 | 0 | 19 | 0 | 23 | 19 | 0 | 29 | 29 | 23 |
| 11 | 23 | 24 | 0 | 0 | 22 | 14 | 25 | 19 | 8 | 34 | 27 | 9 |
| 12 | 28 | 28 | 13 | 0 | 16 | 19 | 48 | 9 | 12 | 35 | 22 | 8 |
| 13 | 26 | 18 | 17 | 0 | 12 | 23 | 68 | 8 | 16 | 26 | 20 | 10 |
| 14 | 15 | 18 | 23 | 0 | 32 | 22 | 61 | 7 | 22 | 33 | 25 | 7 |
| 15 | 8 | 16 | 25 | 7 | 34 | 20 | 45 | 0 | 34 | 26 | 8 | 0 |
| 16 | 15 | 14 | 29 | 7 | 36 | 18 | 49 | 0 | 33 | 21 | 8 | 0 |
| 17 | 19 | 8 | 31 | 14 | 34 | 30 | 44 | 0 | 32 | 20 | 8 | 0 |
| 18 | 22 | 8 | 24 | 20 | 24 | 24 | 37 | 0 | 29 | 12 | 21 | 0 |
| 19 | 25 | 7 | 20 | 13 | 15 | 7 | 25 | 0 | 22 | 0 | 36 | 7 |
| 20 | 28 | 0 | 19 | 12 | 8 | 0 | 10 | 0 | 12 | 11 | 21 | 8 |
| 21 | 17 | 0 | 15 | 8 | 9 | 15 | 9 | 0 | 20 | 14 | 26 | 8 |
| 22 | 8 | 0 | 22 | 13 | 9 | 24 | 9 | 10 | 19 | 7 | 40 | 23 |
| 23 | 9 | 7 | 26 | 11 | 9 | 34 | 9 | 8 | 18 | 7 | 57 | 30 |
| 24 | 15 | 7 | 30 | 10 | 17 | 35 | 8 | 7 | 8 | 7 | 60 | 45 |
| 25 | 10 | 16 | 30 | 9 | 22 | 17 | 8 | 14 | 0 | 0 | 74 | 38 |
| 26 | 14 | 17 | 29 | 9 | 25 | 8 | 8 | 8 | 14 | 7 | 71 | 41 |
| 27 | 7 | 18 | 24 | 8 | 16 | 0 | 0 | 9 | 8 | 13 | 74 | 34 |
| 28 | 8 | 18 | 19 | 8 | 17 | 13 | 0 | 16 | 16 | 16 | 65 | 26 |
| 29 | 9 | 23 | 15 | 8 | 19 | 11 | | 8 | 9 | 20 | 58 | 16 |
| 30 | 10 | 30 | 8 | 0 | 19 | 8 | | 8 | 8 | 30 | 45 | 8 |
| 31 | 9 | | 0 | | 12 | 10 | | 8 | | 40 | | 7 |
| MEAN | 16.4 | 13.5 | 20.6 | 5.2 | 15.3 | 15.7 | 22.6 | 8.0 | 13.2 | 18.4 | 38.4 | 21.2 |

1976 yearly mean = 12.6

# DAILY SOLAR FLUX AT 2800 MHz
# OTTAWA ARO

## FLUX ADJUSTED TO 1 A.U., $S_a$

| | 1976 | | | | | 1977 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL |
| 1 | 75.9 | 76.3 | 74.6 | 70.9 | 70.2 | 73.6 | 81.7* | 72.6 | 74.8 | 77.2 | 88.9 | 102.0 |
| 2 | 77.6 | 75.3 | 73.9 | 69.1 | 71.6 | 76.5 | 82.1 | 75.4 | 76.3 | 78.5 | 90.9* | 100.7 |
| 3 | 82.3 | 75.7 | 73.8 | 69.8 | 71.2 | 76.0 | 80.9 | 74.8 | 76.6 | 81.9 | 93.0* | 97.4 |
| 4 | 82.3 | 75.9 | 73.1 | 69.9 | 71.3 | 75.5 | 78.7 | 75.9 | 76.8 | 81.4* | 94.2 | 94.0 |
| 5 | 84.2 | 75.4 | 74.8 | 70.9 | 70.1 | 74.0 | 77.8 | 77.6 | 75.5 | 79.6 | 90.2* | 88.0* |
| 6 | 84.3 | 73.1 | 74.7 | 69.7 | 70.1 | 72.4 | 75.2 | 77.6 | 76.1 | 78.5 | 90.6 | 90.2 |
| 7 | 83.7 | 73.3 | 74.5 | 69.5 | 69.7 | 71.4 | 74.6 | 77.2 | 75.5* | 77.1* | 92.0 | 85.2 |
| 8 | 82.6 | 72.9 | 74.6 | 69.3 | 70.3 | 69.6 | 78.6 | 81.6 | 74.3 | 77.9 | 91.9* | 82.1 |
| 9 | 82.8 | 73.2 | 74.8 | 70.7 | 74.3 | 68.4 | 83.1 | 80.3 | 74.8 | 83.6 | 90.9 | 79.0 |
| 10 | 82.8 | 75.8 | 74.9 | 69.4 | 76.8 | 68.8 | 83.5 | 80.5 | 76.5 | 80.8 | 89.2* | 76.9 |
| 11 | 80.4 | 75.7 | 73.7 | 70.5 | 78.3 | 71.2 | 84.6 | 78.9 | 79.2 | 80.8 | 87.2 | 76.2 |
| 12 | 80.6 | 75.7 | 73.3 | 70.8 | 78.6 | 74.9 | 86.9* | 78.6 | 80.2 | 79.7 | 83.3 | 75.8 |
| 13 | 78.7 | 74.3 | 72.6 | 69.4 | 78.1 | 77.5 | 88.5 | 77.9 | 82.7 | 81.5 | 84.2 | 77.8 |
| 14 | 73.4 | 74.7 | 74.4 | 69.2 | 81.0 | 74.5 | 85.2 | 77.2 | 83.4 | 84.8 | 82.3 | 76.8 |
| 15 | 72.8 | 73.9 | 75.5 | 71.1 | 79.8 | 75.6 | 84.4 | 74.8 | 86.8 | 85.0 | 82.3 | 76.0 |
| 16 | 72.9 | 75.8 | 77.0 | 71.1 | 77.8 | 77.5 | 85.7 | 74.1 | 83.7 | 85.1 | 81.4 | 76.9 |
| 17 | 77.8 | 76.5 | 78.0 | 72.8 | 75.5 | 76.1 | 89.6* | 74.1 | 83.6 | 84.1 | 82.4 | 76.5 |
| 18 | 78.2 | 74.3 | 77.3 | 75.6 | 73.8 | 75.4 | 86.5 | 73.9 | 80.8 | 82.9 | 84.3 | 76.9 |
| 19 | 76.1 | 73.3 | 76.6* | 74.6* | 72.9 | 76.9 | 82.8 | 74.0 | 79.8* | 82.1 | 85.2 | 76.9 |
| 20 | 74.5 | 72.2 | 75.8 | 72.9 | 71.7 | 75.2 | 81.1 | 72.3 | 80.4* | 81.3 | 86.9 | 80.1 |
| 21 | 73.2 | 70.9 | 73.5 | 73.2 | 71.8 | 74.0 | 78.6 | 72.8 | 80.8 | 81.4 | 92.4 | 81.7 |
| 22 | 72.3 | 70.5 | 73.4 | 73.3 | 73.4 | 76.8 | 75.9 | 74.6 | 80.1 | 82.9 | 98.8* | 83.1 |
| 23 | 70.8 | 72.0 | 80.1 | 72.5 | 73.7 | 78.7 | 75.9 | 74.7 | 77.5 | 82.4 | 99.4 | 85.0 |
| 24 | 70.9 | 72.5 | 80.1 | 72.9 | 74.2 | 77.4 | 74.2 | 74.8 | 76.5 | 79.2 | 107.4 | 84.0 |
| 25 | 70.6 | 73.4 | 84.7 | 72.7 | 75.6 | 74.9 | 74.3 | 74.0 | 76.4 | 77.4 | 113.8 | 86.0 |
| 26 | 74.1 | 72.8 | 80.4 | 72.1 | 75.6 | 76.0 | 72.3 | 75.1 | 75.4 | 76.8 | 120.7 | 86.0 |
| 27 | 71.5 | 73.3 | 77.4 | 73.7 | 75.2 | 75.3 | 72.0 | 74.5 | 74.9 | 77.9 | 115.9* | 85.4 |
| 28 | 72.8 | 73.6 | 73.8 | 71.7 | 74.5 | 77.1 | 72.6 | 74.4 | 74.2 | 79.1 | 113.4 | 87.5 |
| 29 | 73.3 | 71.9 | 72.1 | 69.7 | 74.8 | 76.1 | | 75.4 | 74.8 | 81.7 | 111.9 | 86.7 |
| 30 | 73.6 | 72.6 | 72.1 | 69.7 | 75.1 | 76.3 | | 74.6 | 76.6 | 89.9 | 106.9 | 84.1 |
| 31 | 73.8 | | 78.4 | | 76.4 | 79.6 | | 74.1 | | 92.0 | | 80.4 |
| MEAN | 76.6 | 73.9 | 75.4 | 71.3 | 74.3 | 74.9 | 80.3 | 75.8 | 78.2 | 81.4 | 94.5 | 83.7 |

* adjusted for burst

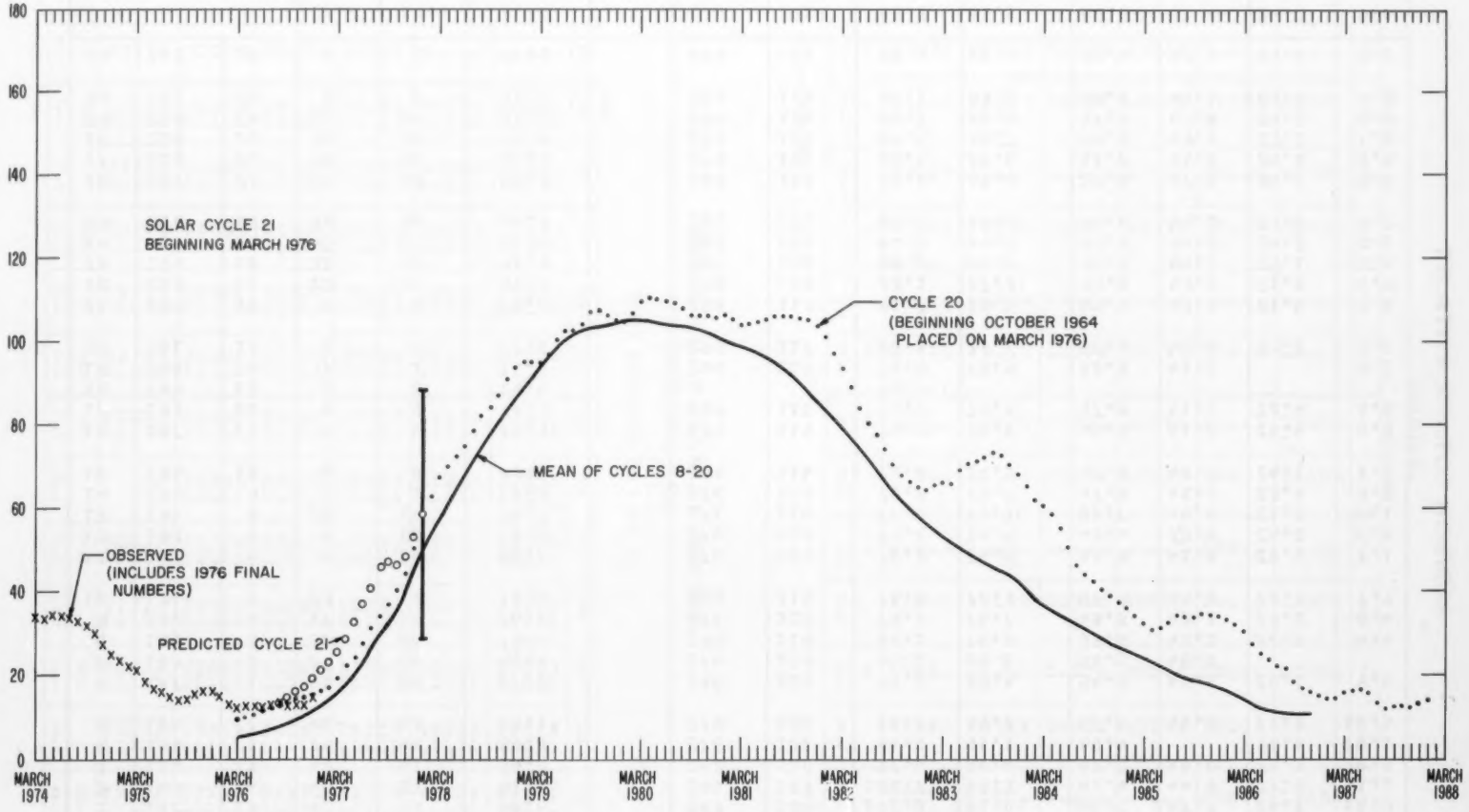
# DAILY SOLAR INDICES

JULY 1977

| JUL 1977 | YEAR DAY | BARTELS 27-DAY CYCLE NUMBER | SUNSPOT NUMBERS | | OBSERVED FLUX | SOLAR FLUX ADJUSTED TO 1 A.U. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $R_Z$ | $R_{A'}$ | OTTAWA 2800 | AFGL 15400 | AFGL 8800 | AFGL 4995 | OTTAWA 2800 | AFGL 2695 | AFGL 1415 | AFGL 606 | AFGL 410 | AFGL 245 |
| 1 | 182 | 23 | 42 | 33 | 98.6 | | 283 | 136 | 102.0 | 101.0 | 65.7 | 47.2 | 26.3 | 12.9 |
| 2 | 183 | 24 | 45 | 39 | 97.4 | | 285 | 133 | 100.7 | 99.3 | 62.4 | 44.9 | 27.9 | 11.1 |
| 3 | 184 | 25 | 42 | 41 | 94.2 | | 282 | 130 | 97.4 | 96.4 | 62.0 | 46.6 | 30.3 | 18.8 |
| 4 | 185 | 26 | 39 | 41 | 90.9 | | 278 | 130 | 94.0 | 95.1 | 60.4 | | 36.6 | 24.1 |
| 5 | 186 | 27 | 40 | 43 | 85.1* | | 279 | 126 | 88.0* | 89.7 | 55.5 | 45.2 | 22.0 | 10.6 |
| 6 | 187 | 1 | 40 | 35 | 87.2 | | 285 | 126 | 90.2 | 89.4 | 54.5 | 45.1 | 20.1 | 9.6 |
| 7 | 188 | 2 | 25 | 26 | 82.4 | | 276 | 123 | 85.2 | 85.2 | 54.1 | 45.0 | | |
| 8 | 189 | 3 | 20 | 23 | 79.4 | | 273 | 119 | 82.1 | 76.9 | 53.6 | 42.3 | 22.3 | 8.4 |
| 9 | 190 | 4 | 17 | 17 | 76.4 | | 270 | 115 | 79.0 | 76.7 | 48.5 | 42.1 | 23.1 | 8.4 |
| 10 | 191 | 5 | 23 | 13 | 74.4 | | 268 | 115 | 76.9 | 76.3 | 47.9 | 38.8 | 22.3 | 7.7 |
| 11 | 192 | 6 | 9 | 10 | 73.7 | | 270 | 114 | 76.2 | 74.5 | 46.8 | 41.6 | 20.6 | 7.1 |
| 12 | 193 | 7 | 8 | 10 | 73.4 | | 270 | 112 | 75.8 | 74.9 | 49.4 | 39.5 | 24.0 | 8.6 |
| 13 | 194 | 8 | 10 | 14 | 75.3 | | 271 | 114 | 77.8 | 75.3 | 50.7 | 40.6 | 21.3 | 8.1 |
| 14 | 195 | 9 | 7 | 2 | 74.3 | | 270 | 114 | 76.8 | 75.7 | 47.5 | 41.9 | 23.8 | 9.0 |
| 15 | 196 | 10 | 0 | 0 | 73.6 | | 271 | 114 | 76.0 | 74.5 | 47.1 | 40.7 | 24.1 | 8.8 |
| 16 | 197 | 11 | 0 | 0 | 74.4 | | 270 | 114 | 76.9 | 74.5 | 45.5 | 41.2 | 24.4 | 8.6 |
| 17 | 198 | 12 | 0 | 0 | 74.1 | | 267 | 115 | 76.5 | 74.8 | 47.8 | 41.5 | 22.4 | 8.4 |
| 18 | 199 | 13 | 0 | 0 | 74.4 | | | | 76.9 | | | | | |
| 19 | 200 | 14 | 7 | 1 | 74.4 | | 265 | 116 | 76.9 | 75.9 | 50.3 | 41.0 | | 8.1 |
| 20 | 201 | 15 | 8 | 3 | 77.5 | | 270 | 117 | 80.1 | 78.1 | 50.1 | 42.4 | 22.0 | 8.2 |
| 21 | 202 | 16 | 8 | 9 | 79.2 | | 268 | 117 | 81.7 | 80.6 | 49.6 | 43.8 | 21.6 | 8.6 |
| 22 | 203 | 17 | 23 | 18 | 80.5 | | 276 | 118 | 83.1 | 87.3 | 53.1 | 43.0 | 21.8 | 8.9 |
| 23 | 204 | 18 | 30 | 26 | 82.4 | | 285 | 122 | 85.0 | 84.0 | 55.5 | 44.1 | 25.1 | 8.4 |
| 24 | 205 | 19 | 45 | 27 | 81.4 | | 282 | 121 | 84.0 | 84.5 | 53.8 | 44.2 | 24.2 | 8.6 |
| 25 | 206 | 20 | 38 | 32 | 83.3 | | 281 | 121 | 86.0 | 85.1 | 56.6 | 46.0 | 23.5 | 9.2 |
| 26 | 207 | 21 | 41 | 32 | 83.3 | | 280 | 121 | 86.0 | 85.8 | 58.0 | 47.6 | 26.0 | 9.0 |
| 27 | 208 | 22 | 34 | 26 | 82.8 | | 278 | 121 | 85.4 | 85.6 | 58.2 | 48.5 | 26.0 | 8.8 |
| 28 | 209 | 23 | 26 | 19 | 84.9 | | 277 | 125 | 87.5 | 86.7 | 58.0 | 49.0 | 23.3 | 7.2 |
| 29 | 210 | 24 | 16 | 17 | 84.1 | | 275 | 124 | 86.7 | 86.6 | 57.3 | 47.5 | 25.3 | 8.4 |
| 30 | 211 | 25 | 8 | 7 | 81.6 | | 271 | 119 | 84.1 | 83.0 | 56.8 | 45.4 | 25.3 | 9.0 |
| 31 | 212 | 26 | 7 | 2 | 78.1 | | 279 | 118 | 80.4 | 80.4 | 51.4 | 42.3 | 24.7 | 7.2 |
| MEAN | | | 21.2 | 18.3 | 81.1 | | 275 | 120 | 83.7 | 83.1 | 53.6 | 43.8 | 24.3 | 9.6 |

Note: Data gaps in AFGL Sagamore Hill data are due to equipment problems.

7 Jul 77




PREDICTED AND OBSERVED SUNSPOT NUMBERS

## SMOOTHED OBSERVED AND PREDICTED SUNSPOT NUMBERS
## CYCLE 21

| MONTH | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1976 | 15.2 | 13.2 | 12.2 | 12.6 | 12.5 | 12.2 | 12.9 | 13.9 | 14.1 | 13.3 | 13.3 | 14.7 |
| 1977 | 16.6 | 18.5 | 20.9 | 23.7 | 27.0 | 30.6 | 34.1 | 37.6 | 41.1 | 45.2 | 49.8 | 54.3 |
| | | ( 1) | ( 2) | ( 4) | ( 6) | ( 8) | (10) | (14) | (17) | (21) | (23) | (26) |
| 1978 | 58.9 | 64.0 | 68.8 | 72.6 | 75.8 | 78.9 | 82.2 | 86.4 | 91.3 | 95.5 | 99.2 | 102.8 |
| | (30) | (33) | (36) | (39) | (42) | (45) | (46) | (46) | (47) | (48) | (49) | (50) |
| 1979 | 105.8 | 108.3 | 111.4 | 115.0 | 117.6 | 119.1 | 119.9 | 120.2 | 119.8 | 119.2 | 118.8 | 118.9 |
| | (50) | (52) | (55) | (56) | (57) | (59) | (61) | (63) | (64) | (64) | (62) | (61) |
| 1980 | 119.3 | 118.9 | 117.3 | 115.7 | 114.4 | 113.7 | 113.3 | 112.7 | 112.4 | 112.7 | 112.1 | 110.3 |
| | (61) | (62) | (61) | (60) | (59) | (58) | (57) | (58) | (58) | (59) | (59) | (57) |
| 1981 | 108.2 | 106.9 | 105.9 | 105.4 | 105.3 | 104.9 | 104.0 | 102.4 | 100.1 | 97.4 | 94.6 | 92.2 |
| | (56) | (54) | (52) | (51) | (49) | (47) | (47) | (44) | (42) | (41) | (40) | (39) |
| 1982 | 90.5 | 88.5 | 86.0 | 82.6 | 78.9 | 75.9 | 72.5 | 69.9 | 66.9 | 63.8 | 61.7 | 60.3 |
| | (37) | (35) | (34) | (33) | (31) | (29) | (25) | (24) | (23) | (22) | (22) | (22) |
| 1983 | 58.9 | 57.2 | 55.2 | 53.9 | 52.8 | 51.4 | 50.2 | 49.1 | 48.3 | 47.2 | 45.6 | 43.3 |
| | (22) | (22) | (22) | (23) | (24) | (25) | (27) | (28) | (28) | (29) | (28) | (27) |
| 1984 | 40.6 | 38.5 | 37.2 | 36.0 | 34.4 | 33.0 | 31.9 | 30.9 | 29.6 | 28.5 | 27.4 | 26.4 |
| | (27) | (28) | (30) | (30) | (30) | (29) | (28) | (26) | (26) | (26) | (25) | (25) |
| 1985 | 25.8 | 24.9 | 24.0 | 23.0 | 22.2 | 21.4 | 20.5 | 19.4 | 18.8 | 18.8 | 18.4 | 17.8 |
| | (25) | (25) | (23) | (22) | (21) | (21) | (22) | (23) | (23) | (23) | (23) | (22) |
| 1986 | 16.3 | 15.8 | 14.9 | 14.0 | 13.2 | 12.8 | 12.4 | 12.2 | 12.0 | 11.8 | 11.9 | 12.3 |
| | (21) | (20) | (19) | (18) | (17) | (16) | (15) | (14) | (12) | (11) | (10) | (10) |
| 1987 | 12.8 | 13.6 | 14.3 | 15.1 | 16.0 | | | | | | | |
| | (11) | (12) | (13) | (13) | (14) | | | | | | | |

For each month, the upper figure is the observed or predicted Zürich smoothed sunspot number. The lower figure in parenthesis is the corresponding absolute value of the 90% prediction interval, an indication of the uncertainty above and below the predicted number. Observed numbers are those with no prediction intervals. The observed smoothed sunspot numbers are based on final Zürich numbers through 1976.

The predicted sunspot numbers are derived from a regression analysis based on cycles 8 through 20. Tests indicate that earlier cycles are from a different statistical population.

# Hα SOLAR FLARES

JULY 1977

| OBSERVATORY | OBSERVED UT | | | | LOCATION | | | | | DURATION | IMPORTANCE | OBS. | | MEASUREMENTS | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DATE JUL | START | MAX. PHASE | END | APPROX. LAT. | APPROX. MER. DIST. | CENTRAL DISTANCE | MCMATH PLAGE REGION | CMP DAY | MIN. | | COND. | TYPE | TIME UT | MEAS. AREA Mill. of Disk | CORR. AREA Sq. Deg. | |
| UPIC | 01 | 0910 | | 0910D | N14 | W20 | .478 | | 30.9 | | SF | | P | 0910 | 122 | 67.0 | E |
| MCMA | 01 | 1932 | 1940 | 1955 | N23 | W24 | .612 | 14822 | 31.0 | 23 | SN | | C | 1940 | 30 | .4 | D |
| MITK | 02 | 0535E | | 0542D | N40 | W23 | .778 | | 31.5 | 7D | SF | | C | 0535 | 50 | .7 | E |
| MANI | 03 | 2355 | 2357 | 2400 | N39 | W44 | .875 | | 31.7 | 5 | SF | 3 | P | 2357 | 30 | .5 | |
| MCMA | 06 | 1134 | 1137 | 1149 | N20 | W37 | .706 | 14841 | 3.7 | 15 | SN | | C | 1137 | 30 | .7 | E |
| MCMA | 06 | 1325 | 1328 | 1341 | N20 | W38 | .715 | 14841 | 3.7 | 16 | SN | | C | 1328 | 40 | .5 | EH |
| WEND | 06 | 1332 | | 1355 | N20 | W36 | .696 | | 3.9 | 23 | SN | | | | | | |
| MCMA | 06 | 1827 | 1829 | 1830D | N20 | W41 | .744 | 14841 | 3.7 | 3D | SF | | C | 1829 | 35 | .4 | D |
| PALE | 06 | 1840 | 1845 | 1853 | N20 | W42 | .754 | | 3.6 | 13 | SN | 3 | C | | 83 | | DE |
| PALE | 06 | 2309 | 2310 | 2316 | N21 | W44 | .778 | | 3.7 | 7 | SF | 3 | C | | 97 | | |
| MCMA | 07 | 2013E | | 2043D | N23 | W56 | .883 | 14841 | 3.6 | 30D | SN | | C | 2013 | 25 | .5 | D |
| MCMA | 08 | 1922E | | 1924D | N22 | W72 | .970 | 14841 | 3.4 | 2D | SF | | P | 1922 | 20 | .9 | BD |
| RAMY | 10 | 1232E | 1233U | 1249 | N23 | W90 | 1.001 | | 3.8 | 17D | SF | 3 | C | | 0 | | |
| RAMY | 12 | 1140E | 1141U | 1150 | N21 | W51 | .837 | | 8.7 | 10D | SF | 4 | C | | 40 | | |
| WEND | 12 | 1722E | | 1740 | S20 | W22 | .433 | 14838 | 11.1 | 18D | 1N | | V | | 300 | | |
| PALE | 12 | 1730 | 1732 | 1737 | S20 | W25 | .471 | | 10.9 | 7 | SF | 3 | C | | 60 | | DE |
| MITK | 13 | 0014 | | 0026D | S22 | W28 | .523 | | 10.9 | 12D | SB | | C | 0016 | 50 | .7 | E |
| MCMA | 13 | 1101E | | 1120D | S22 | W34 | .597 | 14838 | 10.9 | 19D | SN | | C | 1101 | 50 | .7 | E |
| MCMA | 14 | 1148 | 1154 | 1240 | S22 | W47 | .746 | 14838 | 11.0 | 52 | SB | | C | 1154 | 70 | 1.2 | EL |
| MITK | 21 | 2305E | 2319 | 2327 | S22 | E90 | .999 | 14865 | 28.7 | 22D | 1N | | C | 2319 | 90 | | DH |
| RAMY | 22 | 1155E | 1158U | 1209 | S25 | E75 | .963 | | 28.1 | 14D | SF | 2 | C | | 64 | | DE |
| MCMA | 22 | 1156E | 1158 | 1208 | S26 | E80 | .981 | 14874 | 28.5 | 12D | SB | | C | 1158 | | | E |
| MITK | 24 | 0538 | 0543 | 0558 | S26 | E54 | .826 | | 28.3 | 20 | SN | | C | 0543 | 70 | 1.5 | E |
| RAMY | 25 | 2139 | 2141U | 2145D | S25 | E30 | .576 | | 28.2 | 6D | SF | 2 | C | | 95 | | F |
| MCMA | 26 | 1351 | 1352 | 1405 | S26 | E22 | .500 | 14874 | 28.2 | 14 | SF | | C | 1352 | 60 | .8 | E |
| MCMA | 26 | 1743E | 1750 | 1805D | N21 | W39 | .720 | 14871 | 23.8 | 22D | SF | | C | 1750 | 35 | .5 | E |
| BUCA | 27 | 0640 | | 0655 | N21 | W47 | .795 | | 23.8 | 15 | SN | | C | 0640 | 53 | .8 | CD |
| MCMA | 27 | 1120 | 1122 | 1126 | S26 | E11 | .405 | 14874 | 28.3 | 6 | SF | | C | 1122 | 40 | .5 | E |
| MCMA | 27 | 1547 | 1550 | 1618 | N22 | W53 | .850 | 14871 | 23.7 | 31 | SN | | C | 1550 | 60 | 1.1 | E |
| MCMA | 27 | 1950 | 1954 | 2020 | N22 | W55 | .866 | 14871 | 23.7 | 30 | SN | | C | 1954 | 50 | .9 | DH |
| UPIC | 28 | 0540 | 0600 | 0645D | N20 | W61 | .904 | | 23.7 | 65D | SF | | P | 0600 | 41 | 42.0 | K |
| MCMA | 28 | 1538E | | 1548D | N22 | W72 | .967 | 14871 | 23.3 | 10D | SF | | C | 1539 | 25 | .8 | DH |
| MITK | 30 | 0704 | 0722 | 0727D | N18 | W42 | .732 | 14866 | 27.1 | 23D | 1N | | C | 0722 | 220 | 3.1 | E |
| BUCA | 30 | 0715 | | 0800 | N14 | W41 | .702 | 14866 | 27.2 | 45 | 1F | | C | 0734 | 214 | 2.9 | C |

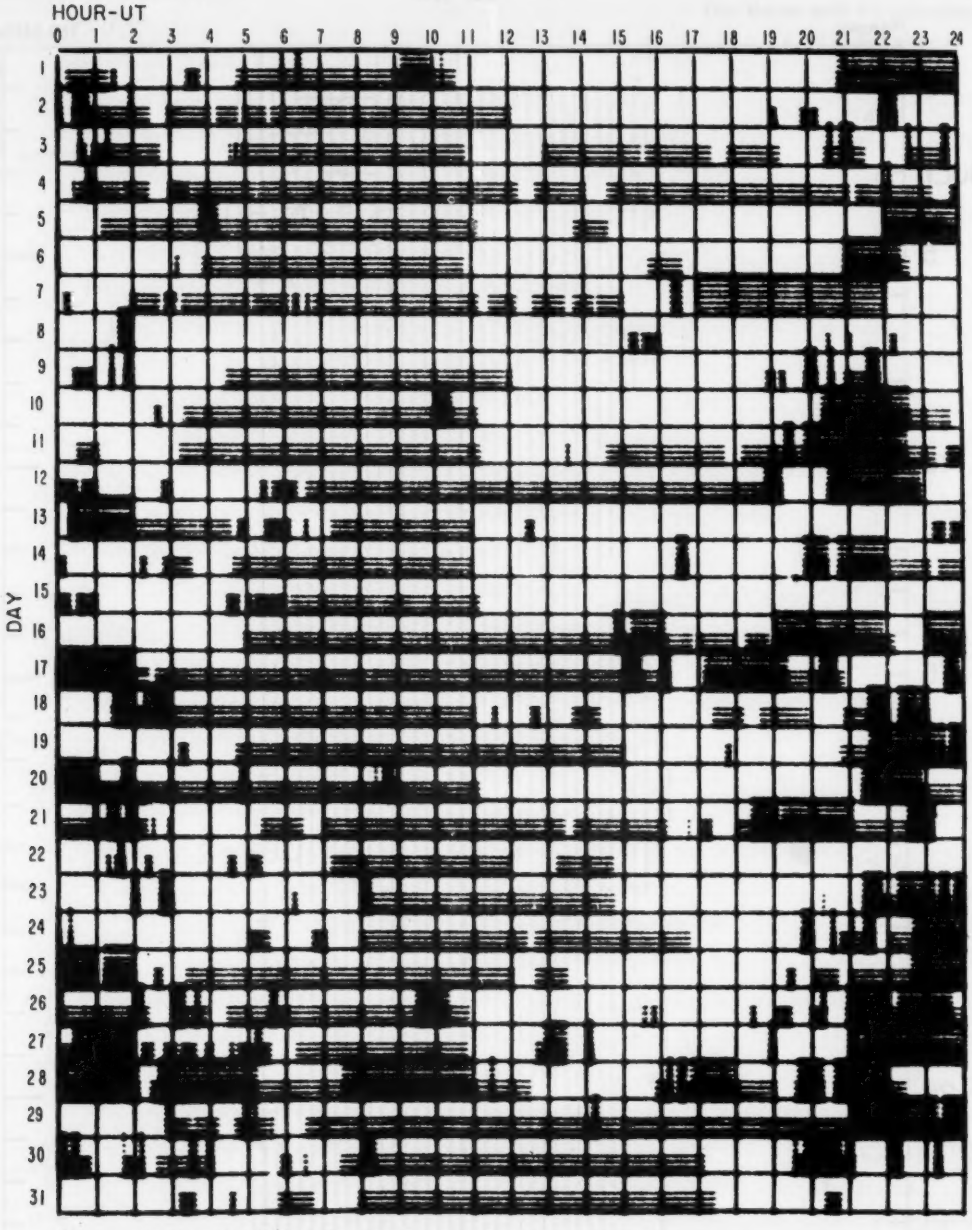
"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium $D_3$ in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

# INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

JULY 1977




Observatories included in total patrol:

| | | | | | |
|---|---|---|---|---|---|
| Bucharest | Kandilli | Manila | Mitaka | Ramey | Upice |
| Herstmonceux | Kodaikanal | McMath-Hulbert | Palehua | Tehran | Wendelstein |
| Istanboul | Locarno | | | | |

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

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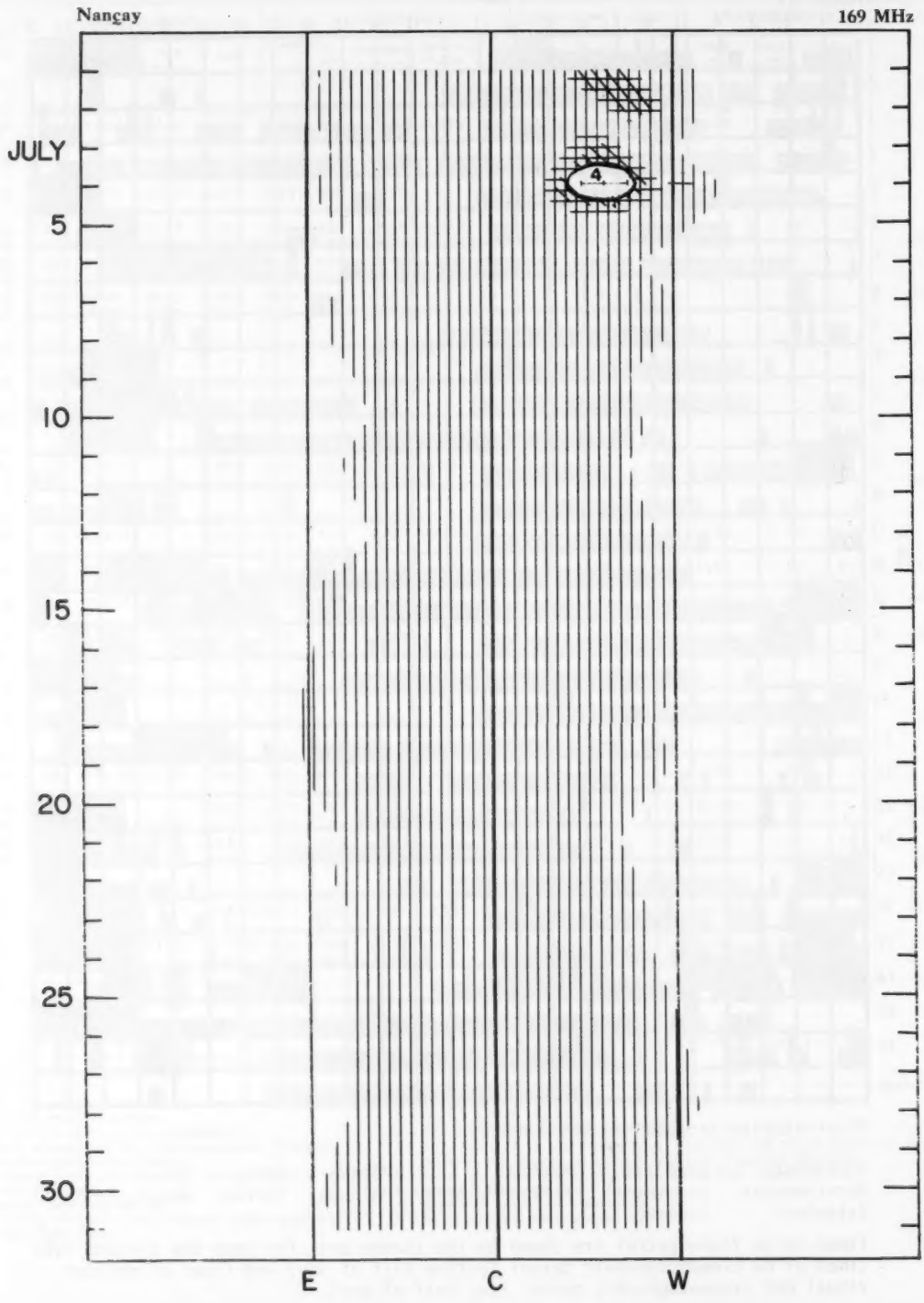
Jul 77

# SOLAR RADIO EMISSION
## INTERFEROMETRIC OBSERVATION

JULY 1977

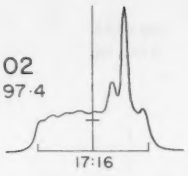
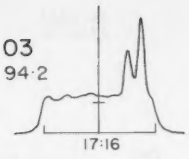
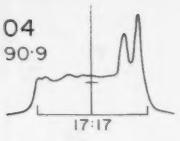
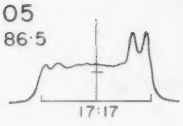
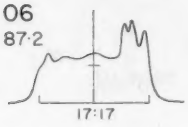
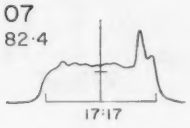
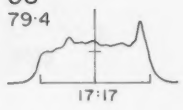
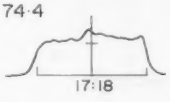
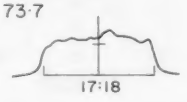
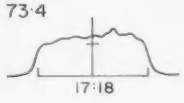
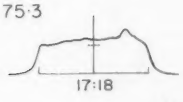
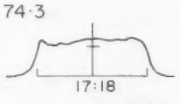
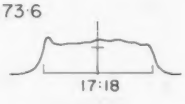
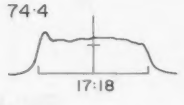
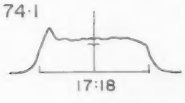
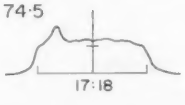
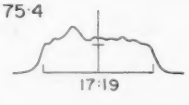
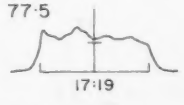
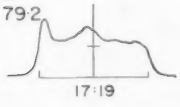
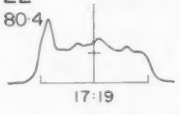
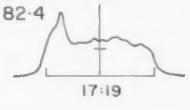
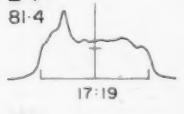
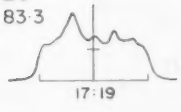
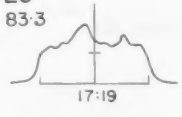
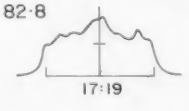
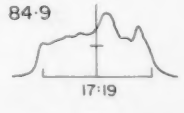
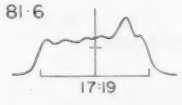


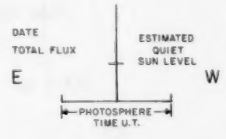
# EAST-WEST SOLAR SCANS

## JULY 1977

ALGONQUIN RADIO OBSERVATORY
CANADA

10·7cm
Fan Beam with 1·5 minutes of arc
E-W Resolution

| | | | |
|---|---|---|---|
| 01<br>98·6<br>NO DATA | 02<br>97·4<br>  <br>17:16 | 03<br>94·2<br>  <br>17:16 | 04<br>90·9<br>  <br>17:17 |
| 05<br>86·5<br>  <br>17:17 | 06<br>87·2<br>  <br>17:17 | 07<br>82·4<br>  <br>17:17 | 08<br>79·4<br>  <br>17:17 |
| 09<br>76·4<br> <br>17:17 | 10<br>74·4<br>  <br>17:18 | 11<br>73·7<br>  <br>17:18 | 12<br>73·4<br>  <br>17:18 |
| 13<br>75·3<br>  <br>17:18 | 14<br>74·3<br>  <br>17:18 | 15<br>73·6<br>  <br>17:18 | 16<br>74·4<br>  <br>17:18 |
| 17<br>74·1<br>  <br>17:18 | 18<br>74·5<br>  <br>17:18 | 19<br>75·4<br>  <br>17:19 | 20<br>77·5<br>  <br>17:19 |
| 21<br>79·2<br>  <br>17:19 | 22<br>80·4<br>  <br>17:19 | 23<br>82·4<br>  <br>17:19 | 24<br>81·4<br>  <br>17:19 |
| 25<br>83·3<br>  <br>17:19 | 26<br>83·3<br>  <br>17:19 | 27<br>82·8<br>  <br>17:19 | 28<br>84·9<br>  <br>17:19 |
| 29<br>84·1<br> <br>17:19 | 30<br>81·6<br>  <br>17:19 | 31<br>78·1<br>NO DATA | |



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Jul 77

# EAST-WEST SOLAR SCANS

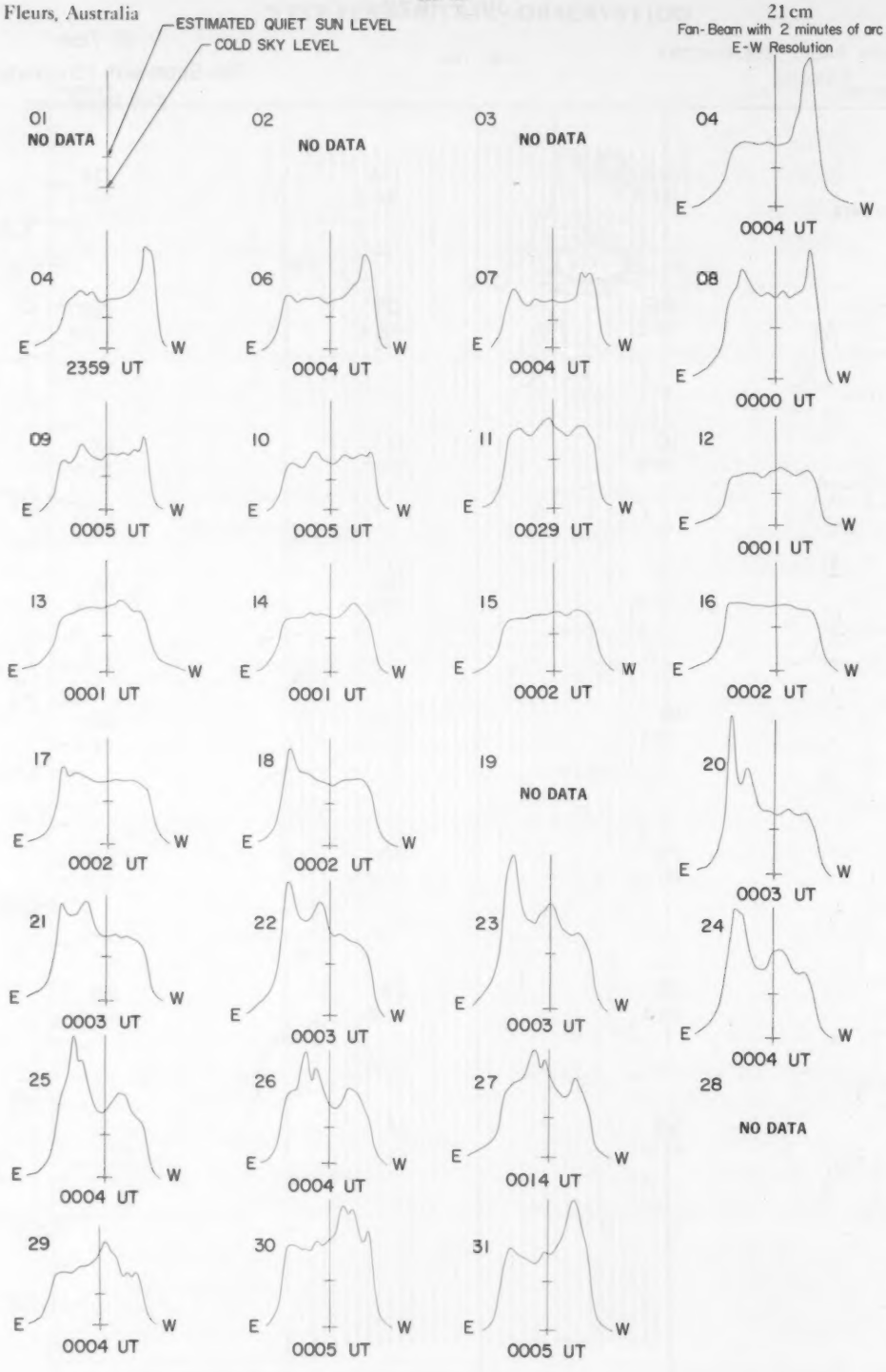
JULY 1977

Fleurs, Australia

ESTIMATED QUIET SUN LEVEL

COLD SKY LEVEL

21 cm
Fan-Beam with 2 minutes of arc
E-W Resolution

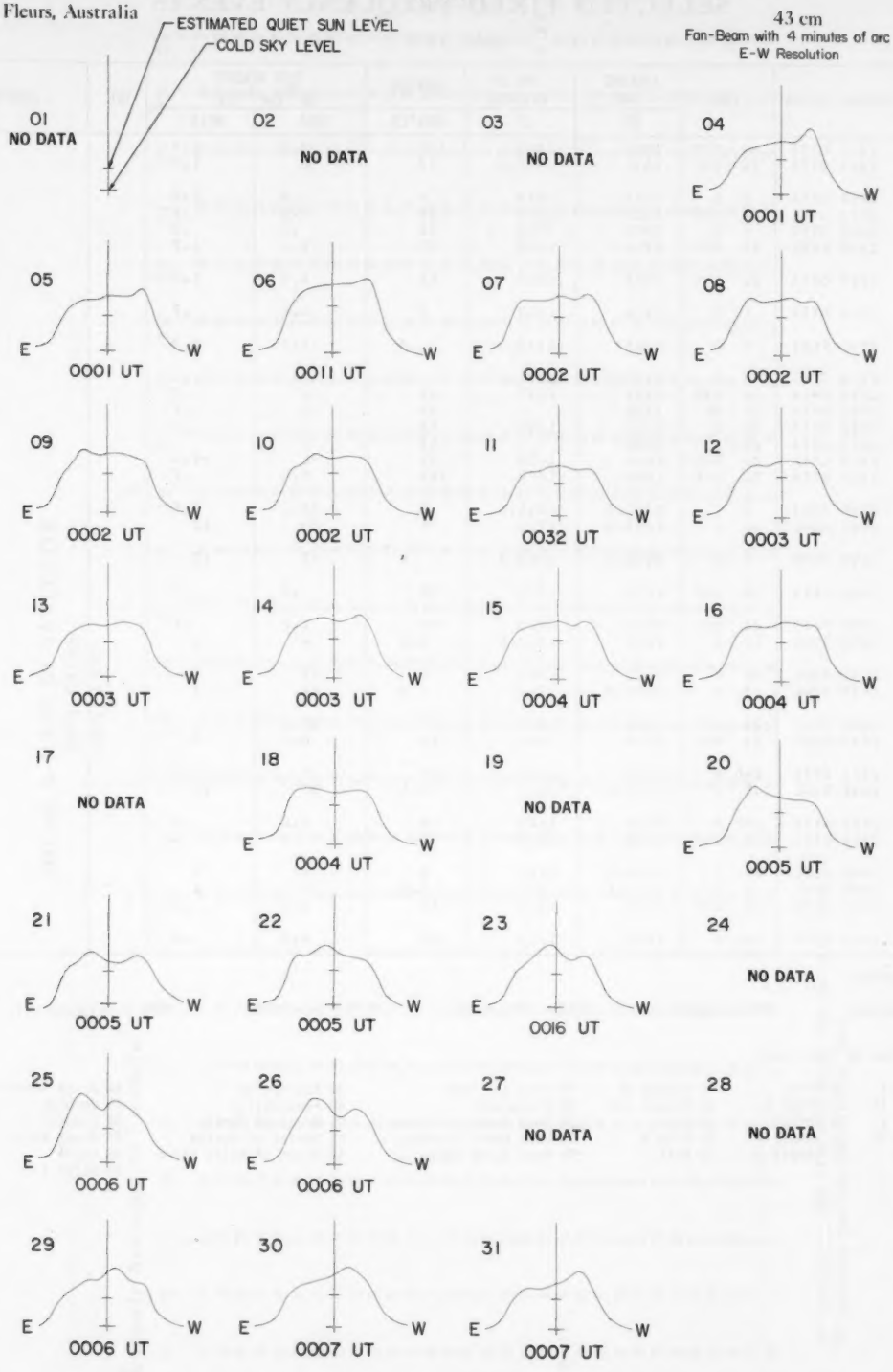


# EAST-WEST SOLAR SCANS

JULY 1977

Fleurs, Australia

43 cm
Fan-Beam with 4 minutes of arc
E-W Resolution



# SOLAR RADIO EMISSION
## SELECTED FIXED FREQUENCY EVENTS

**JULY 1977**

| | FREQUENCY | STATION | TYPE | STARTING TIME | TIME OF MAXIMUM | DURATION | FLUX DENSITY $10^{-22}$ Wm$^{-2}$ Hz$^{-1}$ | | INT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | UT | UT | MINUTES | PEAK | MEAN | | |
| 1 | 2800 | OTTA | 21 GRF | 1900 | 1945 | 110 | 2.6 | 1.3 | | |
| | 2800 | OTTA | 20 GRF | 1931 | 1932.5 | 13 | 3 | 1.5 | | |
| 2 | 2800 | OTTA | 1 S | 1317 | 1319 | 6 | 1.6 | 0.6 | | |
| | 2800 | OTTA | 20 GRF | 1610 | 1625 | 30 | 1.2 | .6 | | |
| | 2800 | OTTA | 1 S | 1950 | 1952 | 10 | .6 | .3 | | |
| | 2695 | PENT | 20 GRF | 2240 | 2305 | 55 | 2.4 | 1.2 | | |
| 3 | 2800 | OTTA | 20 GRF | 1905 | 1925 | 80 | 1.8 | 1.2 | | |
| 4 | 2800 | OTTA | 1 S | 1446 | 1448 | 8 | 1.6 | .7 | | |
| 5 | 2695 | PENT | 8 S | 0118 | 0118.2 | .8 | 2.6 | 1.3 | | |
| 6 | 2800 | OTTA | 8 S | 1137.3 | 1137.4 | .6 | 1 | .5 | | |
| | 2800 | OTTA | 20 GRF | 1225 | 1237 | 45 | 1 | .5 | | |
| | 2800 | OTTA | 27 RF | 1320 | | 95 | 1 | .7 | | |
| | 2800 | OTTA | 24 R | 1320 | 1340 | 20 | 1 | .5 | | |
| | 2800 | OTTA | 24P R | 1340 | | 42 | 1 | | | |
| | 2800 | OTTA | 26 FAL | 1422 | 1455 | 33 | -1 | -0.5 | | |
| | 2800 | OTTA | 20 GRF | 1500 | 1655 | 155 | 1.4 | .7 | | |
| 8 | 2695 | MANI | 3 | 0345.5 | 0345.5 | 2 | 16.2 | 7.5 | | 1 |
| | 2695 | BOUL | 45 C | 1713.5 | 1716 | 5 | 35 | 12 | | |
| 11 | 2695 | SGMR | 3 S | 2012.6 | 2012.8 | .6 | 40 | 12 | | 3 |
| 12 | 2800 | OTTA | 20 GRF | 1725 | 1735 | 30 | .8 | .4 | | |
| 13 | 2695 | PENT | 20 GRF | 0014 | 0025 | 45 | 1.2 | .6 | | |
| | 2695 | BOUL | 45 C | 1811 | 1812.5 | 4.5 | 4 | 1 | | |
| 14 | 2695 | BOUL | 40 F | 1802 | 1804 | 6 | 12 | 4 | | |
| | 2695 | BOUL | 5 S | 2015.5 | 2016 | 1.5 | 10 | 3 | | |
| 19 | 2695 | PENT | 21 GRF | 2250 | 2357 | 120 | 15.6 | | | |
| | 2695 | PENT | 20 GRF | 2259 | 2304 | 16 | 6.4 | 3 | | |
| 22 | 2800 | OTTA | 240 R | 1815 | 2100 | 165 | 3 | 1.5 | | |
| | 2695 | BOUL | 45 C | 2212.5 | 2214 | 4.5 | 57 | 15 | | |
| 23 | 2800 | OTTA | 240 R | 2020 | 2100 | 40 | 1.2 | .6 | | |
| | 2800 | OTTA | 20 GRF | 2220 | 2245 | 90 | .8 | .4 | | |
| 26 | 2695 | BOUL | 45 C | 0114.5 | 0118 | 5 | 4 | 1 | | |
| | 2695 | BOUL | 3 S | 0124.5 | 0125 | 2.5 | 4 | 1 | | |
| | 2800 | OTTA | 20 GRF | 1740 | 1835 | 95 | 1.2 | .8 | | |
| 28 | 2800 | OTTA | 240 R | 1500 | 1520 | 20 | 1.2 | .6 | | |

Observatories:

BOUL = Boulder  MANI = Manila  OTTA = Ottawa ARO  PENT = Penticton  SGMR = Sagamore Hill

Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

## SOLAR X-RAYS BY SATELLITE
## SMS GOES
### JULY 1977

.5 - 4Å Hourly Averages ($10^{-5}$ watts/$m^2$)

| MO DA | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/ 1 | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | B | B | B | B | B | B | B | B | B |
| 7/ 2 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/ 3 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/ 4 | B | M | M | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/ 5 | M | M | M | M | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/ 6 | B | M | M | M | M | M | M | M | M | M | M | M | M | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/ 7 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/ 8 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/ 9 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/10 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/11 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/12 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/13 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/14 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/15 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/16 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/17 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/18 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/19 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 0.04 | B |
| 7/20 | 0.02 | B | B | B | B | B | B | B | B | M | M | M | M | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/21 | B | M | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/22 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/23 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | M | B | B | B | B | B | B | B |
| 7/24 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/25 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/26 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/27 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/28 | B | B | B | B | B | B | B | B | B | B | B | M | M | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/29 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/30 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/31 | B | B | B | B | B | B | B | B | M | M | M | M | M | M | B | B | B | B | B | B | B | B | B | B | B |

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

# SOLAR X-RAYS BY SATELLITE
## SMS GOES
### JULY 1977

**1 - 8Å Hourly Averages ($10^{-4}$ watts/$m^2$)**

| MO DA | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/ 1 | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | B | B | B | B | B | B | B | B | B |
| 7/ 2 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/ 3 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/ 4 | B | M | M | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/ 5 | M | M | M | M | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/ 6 | B | M | M | M | M | M | M | M | M | M | M | M | M | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/ 7 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/ 8 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 0.07 | B | B | B | B |
| 7/ 9 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 0.03 | B | 0.05 | B | B |
| 7/10 | 0.03 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 0.48 | 0.04 | B | B | B | B | B | B | 0.01 |
| 7/11 | B | B | 0.22 | B | B | B | B | 0.03 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/12 | B | B | B | B | B | B | B | 0.05 | 0.05 | 0.10 | B | 0.49 | 0.02 | B | B | B | B | B | B | B | B | B | B | B | 0.02 |
| 7/13 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/14 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/15 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/16 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/17 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/18 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/19 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | 0.07 | B |
| 7/20 | 0.04 | 0.02 | B | B | B | B | B | B | B | M | M | M | M | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/21 | B | M | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/22 | B | B | B | B | B | B | B | B | 0.01 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/23 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | M | B | B | B | B | B | B | B |
| 7/24 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/25 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/26 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/27 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/28 | B | B | B | B | B | B | B | B | B | B | B | M | M | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/29 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/30 | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B | B |
| 7/31 | B | B | B | B | B | B | B | B | M | M | M | M | M | M | B | B | B | B | B | B | B | B | B | B | B |

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

# SOLAR X-RAYS BY SATELLITE

GOES-1

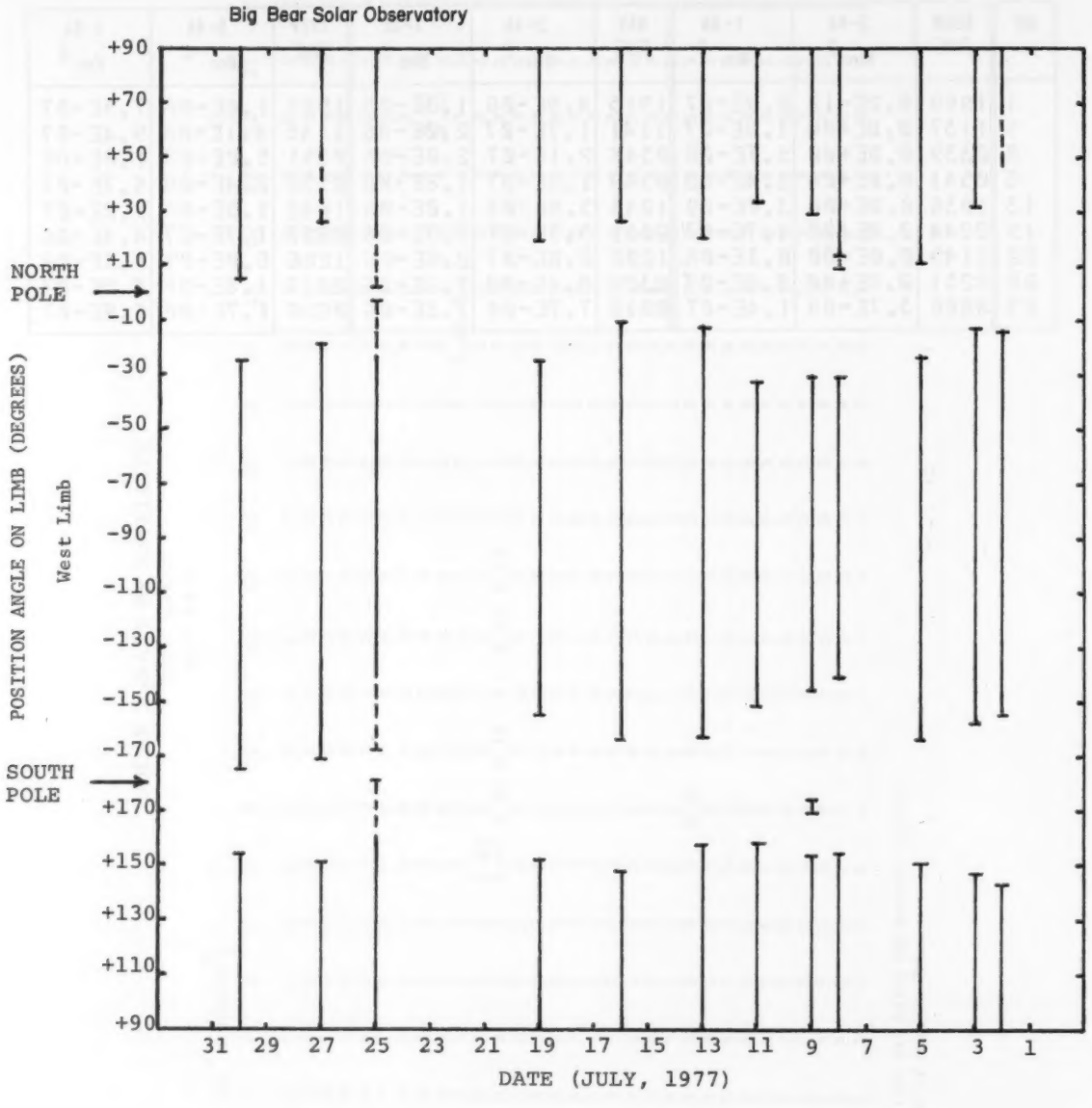
## JULY 1977

| DAY | BEGIN TIME | .5-4A $Wm^{-2}$ | 1-8A $Wm^{-2}$ | MAX TIME | .5-4A $Wm^{-2}$ | 1-8A $Wm^{-2}$ | 1/2P TIME | .5-4A $Wm^{-2}$ | 1-8A $Wm^{-2}$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1909 | 9.2E-10 | 2.9E-07 | 1915 | 9.9E-08 | 1.3E-06 | 1921 | 1.6E-08 | 7.5E-07 |
| 5 | 1137 | 0.0E+00 | 1.9E-07 | 1141 | 1.7E-07 | 2.0E-06 | 1145 | 4.1E-08 | 9.4E-07 |
| 8 | 0339 | 0.0E+00 | 5.7E-08 | 0346 | 2.1E-07 | 2.0E-06 | 0351 | 5.0E-08 | 1.0E-06 |
| 8 | 0541 | 0.0E+00 | 8.4E-08 | 0549 | 1.8E-07 | 1.8E-06 | 0552 | 2.4E-08 | 6.7E-07 |
| 13 | 1036 | 0.0E+00 | 3.0E-09 | 1043 | 5.9E-08 | 1.0E-06 | 1043 | 1.5E-08 | 5.0E-07 |
| 19 | 2244 | 0.0E+00 | 1.7E-07 | 2331 | 5.5E-07 | 8.7E-06 | 0023 | 1.7E-07 | 4.4E-06 |
| 22 | 1149 | 0.0E+00 | 8.3E-08 | 1200 | 2.8E-07 | 2.6E-06 | 1206 | 6.0E-08 | 1.3E-06 |
| 22 | 2251 | 0.0E+00 | 8.6E-08 | 2302 | 8.4E-08 | 1.2E-06 | 2317 | 1.6E-08 | 6.5E-07 |
| 25 | 0806 | 3.7E-09 | 1.4E-07 | 0818 | 7.7E-08 | 1.3E-06 | 0828 | 1.7E-08 | 6.8E-07 |

# CORONAL HOLES

Helium D3 Chromosphere at Solar Limb

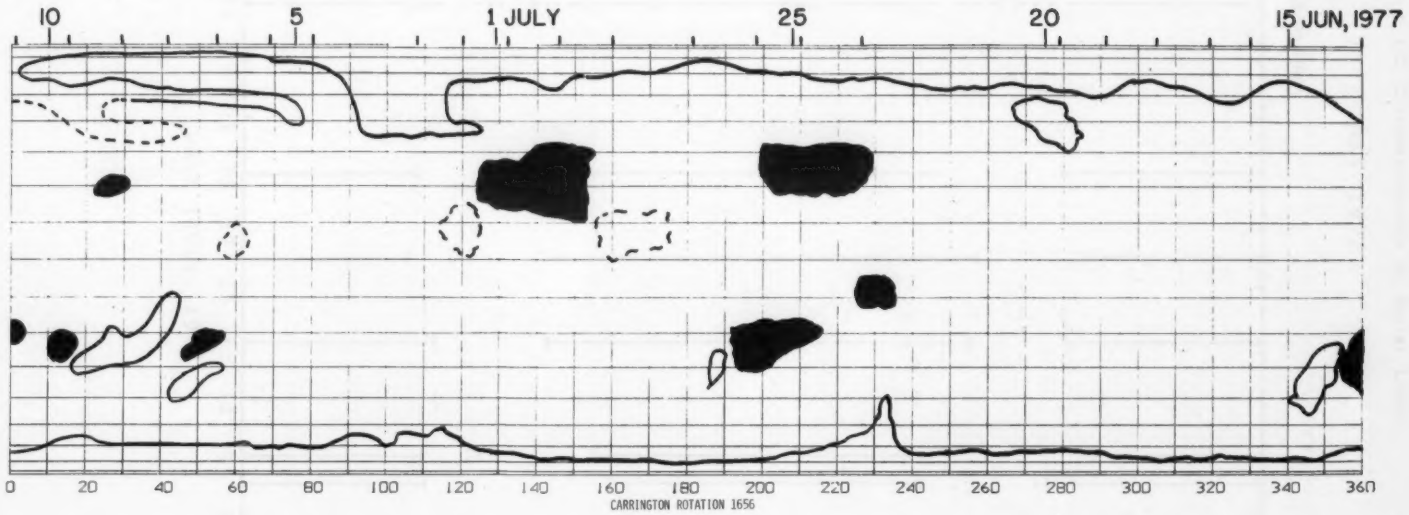
JULY 1977



# HELIUM 10830Å SYNOPTIC MAPS

## CARRINGTON ROTATION 1656

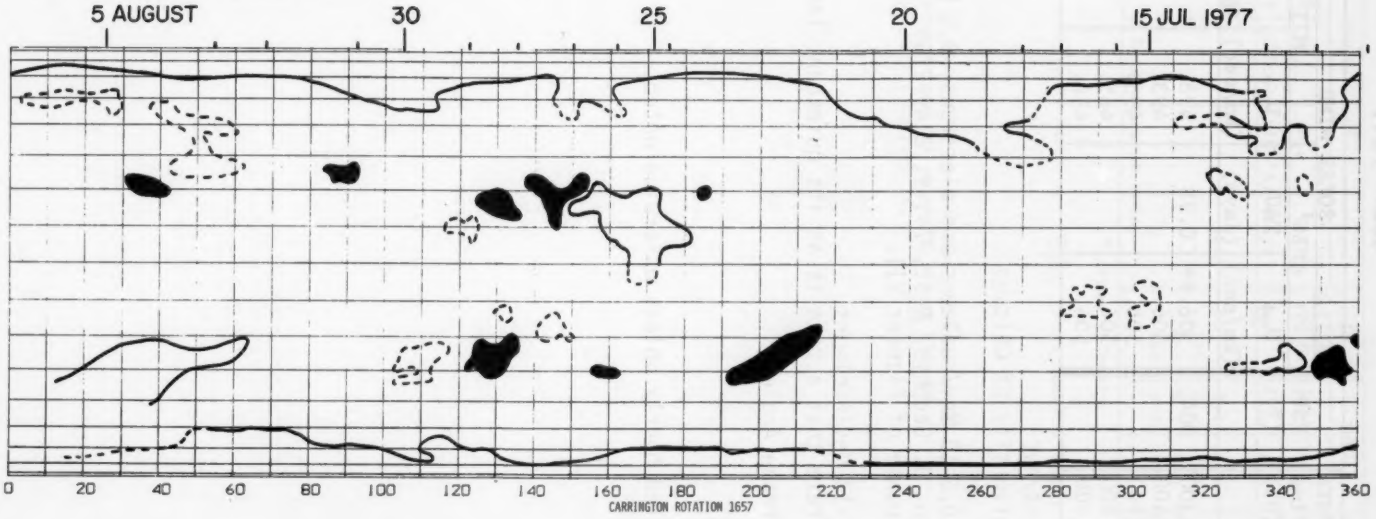
KITT PEAK NATIONAL OBSERVATORY



# HELIUM 10830Å SYNOPTIC MAPS

## CARRINGTON ROTATION 1657

KITT PEAK NATIONAL OBSERVATORY




23 Jul 77

# PIONEER VI

## JULY 1977

| Date July 1977 | DSN Coverage (UT) | Data Time (UT) | ESP (°) | SOLAR WIND | | | | COSMIC RAY PROTONS[2] (particles/sec) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | AMES[1] | | MIT[2] | | | | |
| | | | | $U_{H^+}$ (km/sec) | TAU (days) | $U_{H^+}$ (km/sec) | $N_{H^+}$ ($H^+$/cc) | 6-13 (Mev*) | 13-175 (Mev**) | >175 (Mev) |
| 2 | 1301-1730 | 1300 | 004. | 506.** | 0.98 | 498. | 7.5 | 1.18 | 0.169 | 1.78 |
| | | 1400 | | 506. | | 493. | 6.9 | 1.23 | .114 | 1.83 |
| | | 1500 | | 506. | | 495. | 7.6 | 1.26 | .133 | 1.76 |
| | | 1600 | | 506. | | 465. | 6.8 | 1.26 | .132 | 1.78 |
| | | 1700 | | 506. | | 498. | 8.5 | 1.16 | .105 | 1.87 |

[1] Wolfe - NASA/ARC
[2] Simpson - University of Chicago

* Includes He 0.6-13 Mev/nucleons and electrons ∿0.5 Mev - see J. Retzler and J. A. Simpson, J. Geophys. Res., 74, 9, 2149-2160, 1969 for discussion of the electron response of Pioneer VII.

** Includes He >13 Mev/nucleons.
Q Used to indicate that a rate is at its quiescent level.

ESP = Earth-Sun Probe Angle.

† Peak velocity.

Note: Data sampled hourly unless otherwise noted.

# PIONEER VIII

## JULY 1977

| Date July 1977 | DSN Coverage (UT) | Data Time (UT) | ESP (°) | SOLAR WIND[1] | | | | IP E-FIELD[2] | IMF[3] | | COSMIC RAY PROTONS[4] (particles/sec) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | $U_{H^+}$ (km/sec) | $N_{H^+}$ ($H^+$/cc) | $T_{H^+}$ ($\times 10^6$ °K) | TAU (days) | 400 Hz (mv) | \|B\| (γ) | φ (°) | >13.9 Mev | >64 Mev |
| 9 | 1334-1700 | 1400 | -161.9 | 376.** | | | -12.1 | 0.3 | 5.4 | 199. | 7.76 | 0.55 |
| | | 1500 | | 404. | | | | .595 | 8.4 | 209. | 8.25 | |
| | | 1600 | | 404. | | | | .468 | 4.3 | 140. | 8.04 | |
| | | 1700 | | 404. | | | | .468 | 2.8 | 097. | 7.88 | |
| | | | | Data somewhat noisy. | | | | | | | | |

[1] Wolfe - NASA/ARC.
[2] Scarf - TRW, Inc.
[3] Ness - NASA/Goddard & Mariani - Univ. of Roma
[4] Webber - Univ. of N.H.

* Peak velocity

Note: Data sampled hourly unless otherwise noted.

ESP = Earth-Sun Probe Angle.

Errata: The Cosmic Ray Proton data of April 1977 from Pioneer IX have an error in the >13.9 Mev data. Please delete the value "8.34" at 2000 UT. These data appear in SGD 393 Part I on page 26.

# PIONEER IX

## JULY 1977

| Date July 1977 | DSN Coverage (UT) | Data Time (UT) | ESP (°) | SOLAR WIND[1] | | | | IP E-FIELD[2] | IMF[3] | | COSMIC RAY PROTONS[4] (particles/sec) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | $U_{H^+}$ (km/sec) | $N_{H^+}$ ($H^+$/cc) | $T_{H^+}$ (x$10^6$°K) | TAU (days) | 400 Hz (mv) | \|B\| (γ) | φ (°) | >13.9 Mev | >40 Mev |
| 3 | 1300-1728 | 1300 | 003. | 314.** | | | 1.4 | 0.188 | 10.9 | 154. | 6.59 | 0.704 |
| | | 1400 | | 325. | | | | .14 | 8.5 | 154. | 6.48 | .729 |
| | | 1500 | | 325. | | | | .148 | 9. | 147. | 6.66 | .686 |
| | | 1600 | | 314. | | | | .149 | 10.1 | 138. | 6.63 | .493 |
| | | 1700 | | 325. | | | | .163 | 9.8 | 107. | 6.64 | .575 |
| 10 | 1300-1829 | 1300 | -000.4 | 542. | | | 0.6 | .14 | 6.7 | 116. | 6.47 | .739 |
| | | 1400 | | 564. | | | | .171 | 9.4 | 268. | 6.61 | 1.4 |
| | | 1500 | | 564. | | | | .136 | 8.2 | 260. | 6.46 | 1.4 |
| | | 1600 | | 585. | | | | .148 | 7.5 | 296. | 6.71 | 1.2 |
| | | 1700 | | 585. | | | | .155 | 5.1 | 297. | 6.15 | 1.09 |
| | | 1800 | | 585. | | | | .198 | 6.5 | 312. | 6.57 | 0.61 |

[1] Wolfe - NASA/ARC
[2] Scarf - TRW, Inc.
[3] Sonett and Colburn - NASA/ARC
[4] Webber - Univ. of N.H.

* Peak velocity

Note: Data sampled hourly unless otherwise noted.

ESP = Earth-Sun Probe Angle.

Note: PN-9 went through Inferior Conjunction on 9 July 1977.

# SOLAR WIND

## Interplanetary Scintillations

## JULY 1977

UCSD 74 MHZ SCINTILLATIONS

| DAY | 3C48 | | 3C144 | | 3C147 | | 3C161 | | 3C237 | | 3C273 | | 3C298 | | 3C459 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VEL | ERR | VEL | ERR | VEL | ERR | VEL | ERR | VEL | ERR | VEL | ERR | VEL | ERR | VEL | ERR |
| 1 | 462 | 20 | | | 555 | 13 | 699 | 40 | 420 | 16 | 322 | 1 | 372 | 33 | 409 | 14 |
| 2 | 489 | 1 | 406 | 7 | 555 | 39 | 522 | 68 | 297 | 56 | 344 | 2 | 403 | 17 | 357 | 54 |
| 3 | 491 | 9 | | | | | | | | | 343 | 9 | 262 | 51 | | |
| 4 | 407 | 105 | 391 | 5 | 686 | 5 | 508 | 16 | 378 | 11 | 307 | 10 | | | | |
| 5 | 503 | 44 | | | 745 | 58 | 598 | 9 | 363 | 22 | 272 | 37 | 298 | 66 | | |
| 6 | 414 | 1 | 342 | 25 | 473 | 40 | 640 | 29 | | | 375 | 3 | | | | |
| 7 | 318 | 28 | 398 | 4 | 633 | 66 | 745 | 111 | 394 | 10 | 455 | 86 | 257 | 6 | | |
| 8 | 396 | 4 | 462 | 5 | | | 625 | 167 | | | 405 | 39 | | | | |
| 9 | 446 | 19 | 418 | 26 | 504 | 86 | 455 | 64 | | | 469 | 23 | | | | |
| 10 | 543 | 44 | 448 | 22 | 523 | 85 | 547 | 2 | 307 | 14 | 428 | 22 | 395 | 58 | | |
| 11 | 428 | 49 | 440 | 1 | 544 | 0 | 686 | 22 | 269 | 15 | 289 | 12 | | | | |
| 12 | 623 | 6 | 363 | 0 | 630 | 15 | 648 | 7 | 343 | 4 | 368 | 10 | | | | |
| 13 | 504 | 20 | 454 | 11 | 362 | 30 | 444 | 85 | 388 | 42 | 361 | 1 | 417 | 23 | | |
| 14 | 440 | 3 | 414 | 1 | 534 | 17 | 532 | 9 | 331 | 4 | 449 | 0 | 455 | 11 | | |
| 15 | 492 | 6 | 447 | 19 | 678 | 52 | 473 | 71 | | | 530 | 5 | 457 | 7 | | |
| 16 | 487 | 40 | 447 | 10 | 707 | 110 | 492 | 11 | | | 489 | 3 | | | | |
| 17 | 422 | 0 | 372 | 80 | | | 477 | 20 | | | | | | | | |
| 18 | 457 | 9 | 496 | 59 | 860 | 91 | 557 | 63 | | | 581 | 70 | 500 | 1 | | |
| 19 | | | 488 | 1 | 807 | 210 | 556 | 49 | | | | | 444 | 59 | | |
| 20 | 546 | 86 | | | 684 | 121 | | | 252 | 21 | | | | | | |
| 21 | 739 | 21 | 486 | 4 | 762 | 19 | 554 | 30 | | | 329 | 17 | 441 | 60 | | |
| 22 | 366 | 20 | 668 | 30 | 746 | 49 | 439 | 45 | | | 254 | 0 | | | | |
| 23 | 526 | 47 | | | | | 322 | 39 | | | 321 | 35 | | | | |
| 24 | 716 | 55 | | | 424 | 50 | 369 | 9 | 291 | 21 | | | | | | |
| 25 | 512 | 17 | | | 481 | 55 | 613 | 82 | | | | | | | | |
| 26 | | | 437 | 115 | | | | | | | 387 | 101 | | | | |
| 27 | | | | | | | 357 | 50 | | | 326 | 53 | 359 | 11 | | |
| 28 | | | 445 | 2 | | | | | 282 | 4 | 400 | 18 | 298 | 15 | | |
| 29 | 472 | 0 | | | | | 359 | 51 | | | 438 | 5 | 389 | 10 | | |
| 30 | 453 | 22 | 503 | 6 | | | 394 | 37 | | | 337 | 37 | 328 | 8 | | |
| 31 | | | 458 | 1 | 415 | 32 | | | | | 292 | 39 | 350 | 4 | | |

| JULY | 5 | | | | 15 | | | | 25 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UT | LAT | DIST | DLON | UT | LAT | DIST | DLON | UT | LAT | DIST | DLON |
| 3C48 | 15. | 12. | 0.94 | 17. | 14. | 12. | 0.99 | 16. | 13. | 12. | 1.04 | 15. |
| 3C144 | 19. | 3. | 0.35 | 70. | 18. | 4. | 0.50 | 60. | 17. | 5. | 0.63 | 51. |
| 3C147 | 18. | 53. | 0.52 | 37. | 17. | 43. | 0.60 | 41. | 16. | 34. | 0.69 | 38. |
| 3C161 | 20. | -52. | 0.50 | 26. | 19. | -41. | 0.54 | 37. | 19. | -31. | 0.62 | 39. |
| 3C237 | 24. | -5. | 0.73 | -42. | 23. | -6. | 0.61 | -51. | 22. | -8. | 0.47 | -60. |
| 3C273 | 2. | 2. | 1.00 | -17. | 1. | 4. | 0.95 | -18. | 0. | 4. | 0.89 | -28. |
| 3C298 | 4. | 6. | 1.12 | -15. | 3. | 8. | 1.07 | -16. | 2. | 9. | 1.03 | -17. |
| 3C459 | 12. | 6. | 1.15 | 14. | 11. | 7. | 1.19 | 12. | 11. | 8. | 1.22 | 10. |

# INFERRED IP MAGNETIC FIELD

| BARTELS ROTATION | DATE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1947 | DEC 17 | - | | | | | | TA * | | | * | AT * | TA | | * | | | | T* | | * | | | | A* | TA * | * | |
| 1948 | 1976 JAN 13 | TA | T* | TA | | TA | TA | AT | | | - | - | * | | - | - | | - | - | | | | | | | | TA | |
| 1949 | FEB 9 | | | | - | - | | - | TA | | AT A* | | TA | | | | | | | T* | | | | | * | | TA | TA * |
| 1950 | MAR 7 | | | | | | | - | TA | A* | | TA | | | | | | * | * | AT | | | T* | | | - | TA | |
| 1951 | APR 3 | | | | | | | * | | | | * | | | | | | | | AT | TA T* | T* | | | * | AT | TA A* | |
| 1952 | APR 30 | | AT | | | | | TA | AT T* | | - | | | - | - | - | | | A* | TA | AT AT | | | A* | | | - | |
| 1953 | MAY 27 | - | | | | | | * | TA | | | | | | - | * | | | - | | | | | T* | | | | |
| 1954 | JUN 23 | | | | | | AT | | | AT | | TA T* | AT | | | | TA A* | | | | | | AT A* | TA | AT AT | | | A* |
| 1955 | JUL 20 | | T* | | | | | | | | TA A* | | | | | | | | | AT T* | TA TA | TA - | TA TA | | | | | |
| 1956 | AUG 16 | | | | | | | TA T* | | | | | | | | * | | AT | | | - | AT - | AT - | AT - | TA - | - | - | - |
| 1957 | SEP 12 | - | - | AT - | - | - | - | - | - | - | - | AT - | - | AT - | AT - | - | AT - | - | - | - | - | | | AT | | - | | |
| 1958 | OCT 9 | AT * | A* | | A* | | * | | | | TA | A* | | | * | - | - | - | * | | TA | AT | AT | - | | | AT | |
| 1959 | NOV 5 | AT | TA | | | TA | | T* | | * | AT * | | - | | * | - | | | | | | | | | | | * | |
| 1960 | DEC 2 | | | | | | | TA | | * | | | | | | AT | | * | | | | | - * | | | - | TA - | |
| 1961 | DEC 29 | - | AT - | * | * | * | | | AT | | | | * | | | * | A* | | * | * | | | * | | | | | AT |
| 1962 | 1977 JAN 25 | | | - | | | - | - | TA - | | A* | | | AT - | | | * | - | | | * | - | | | | TA | | |
| 1963 | FEB 21 | AT | - | - | - | - | TA | | TA | | | * | | | | | | | | | - | | | - | | | | |
| 1964 | MAR 20 | | TA | | AT | | | | | * | | | - | - | | | | | | A* | | | | - | | | | |
| 1965 | APR 16 | | | TA | | TA - | AT | TA | | TA | | AT | | | | - | - | TA | | AT AT | | | TA | | | | | AT |
| 1966 | MAY 13 | TA | - | - | | TA | | | TA | | | | | | | | | | | AT | - - | AT T* | - T* | | | | AT AT | - |
| 1967 | JUN 9 | | | | | | | | TA | | - | | | TA | | | | | | AT A* | | | | | AT * | A* | | TA TA |
| 1967 | JUL 6 | | | | | | | | | | A* | | | T* | TA | TA | | T* | | | AT | | | - | AT | | - | |

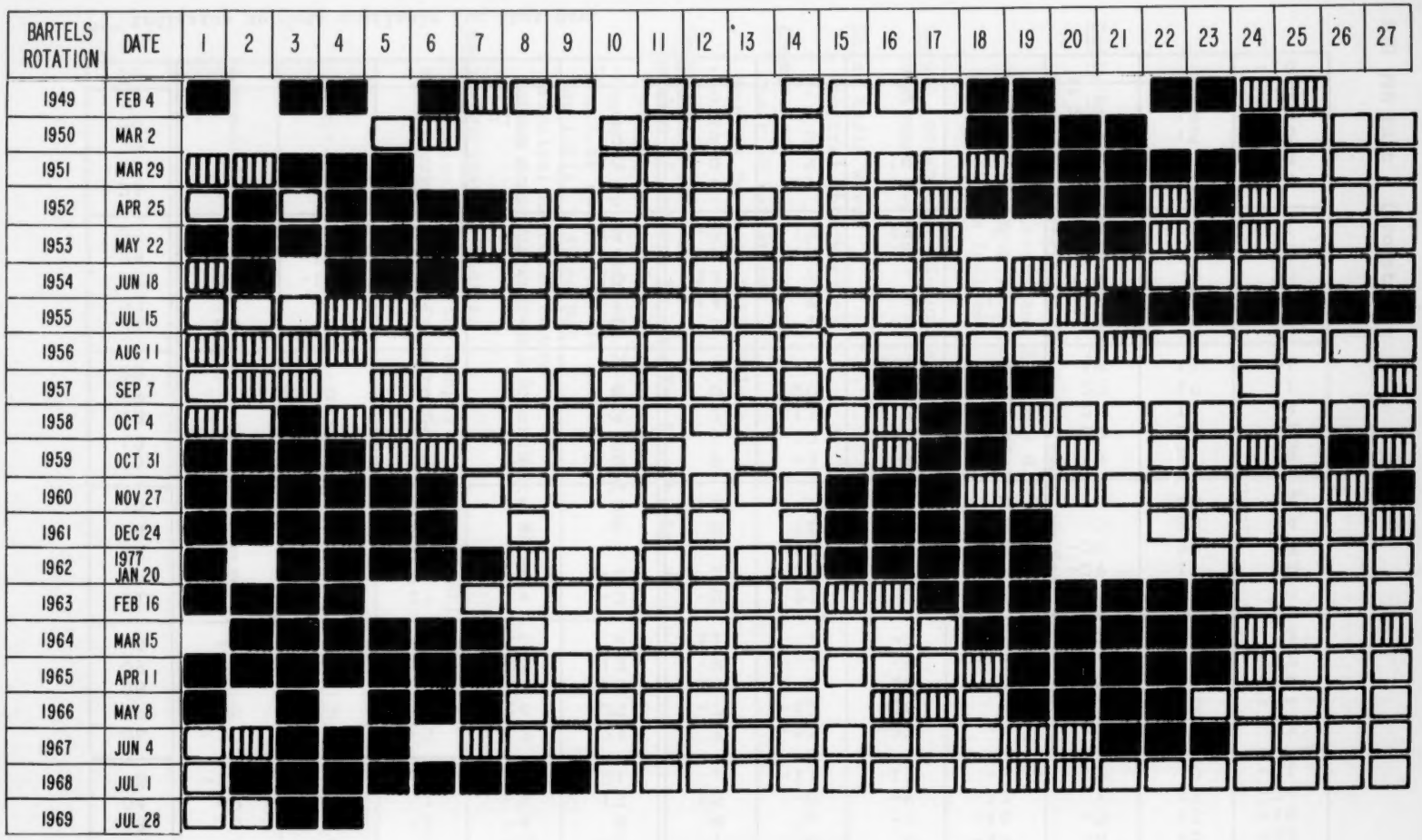
▨ = definitely towards the sun  □ = definitely away from the sun

T = towards the sun  A = away from the sun  * = effect doubtful or not discernible  - = missing data

The table shows daily inferences of the polarity of the interplanetary magnetic field. The first half of the day is based principally on magnetograms produced by the magnetometer at the Vostok Antarctic Station of the USSR. The magnetometer of the U.S. Air Weather Service now operated at Thule by the Danish Meteorological Institute is used for the second half of the day.
Note: The Bartels Rotation numbers after Rotation number 1955 were incorrect in this Table in SGD issues 385 Part I through 389 Part I.
Errata: Thule data for December 5, 6, 10, 11, 12 and 19, 1976 have been corrected.

# STANFORD MEAN SOLAR MAGNETIC FIELD

# STANFORD MEAN SOLAR MAGNETIC FIELD




POLARITY OF THE MEAN SOLAR MAGNETIC FIELD: □ = FIELD >2μT, ▥ = -2μT ≤FIELD ≤2μT, ■ = FIELD <-2μT

No box visible indicates no data available for that day.

Note: Data are taken daily at 2000 UT.
Dates given are not Bartels Rotation dates.
These earlier dates correspond to the occurence of phenomena on the sun which affect the Earth during the given Bartels Rotation.

29 Jul 77

# STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLA)



| | 1976 | | | | | 1977 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | AUG. | SEPT. | OCT. | NOV. | DEC. | JAN. | FEB. | MARCH | APRIL | MAY | JUNE | JULY |
| DAY | | | | | | | | | | | | |
| 01 | 8 | 5 | . | -2 | -4 | . | 5 | 2 | -7 | -13 | 13 | 2 |
| 02 | 6 | 6 | . | -3 | -2 | . | 0 | 0 | -17 | -6 | 15 | -12 |
| 03 | 0 | 2 | -1 | -4 | 5 | 4 | -6 | -2 | -16 | -5 | 15 | -18 |
| 04 | -8 | 8 | 1 | 1 | 13 | 15 | -8 | -9 | -12 | 1 | 13 | -26 |
| 05 | -14 | 7 | 7 | 1 | 21 | . | -11 | -17 | -9 | 7 | 0 | -31 |
| 06 | -10 | 6 | -5 | 7 | 23 | 3 | -17 | -22 | -4 | 11 | -19 | -33 |
| 07 | -5 | 3 | 0 | 16 | 25 | -7 | -12 | -20 | 0 | 7 | -32 | -26 |
| 08 | -4 | -2 | 2 | 25 | 18 | -14 | . | -13 | 5 | -5 | -31 | -14 |
| 09 | -3 | 1 | 6 | 23 | 13 | -9 | . | -9 | 8 | . | . | -7 |
| 10 | -5 | . | 13 | 12 | 8 | -11 | . | -3 | 2 | -22 | 0 | 3 |
| 11 | 2 | 0 | 19 | . | -3 | -8 | 21 | 3 | -4 | . | 7 | 20 |
| 12 | -1 | 2 | 21 | 9 | -4 | . | 19 | 11 | -7 | -29 | 17 | 29 |
| 13 | 1 | 8 | 24 | . | -7 | . | 13 | 18 | -14 | -20 | 28 | 30 |
| 14 | -2 | 12 | 29 | 4 | -1 | 8 | 11 | 3 | -8 | -5 | 38 | 24 |
| 15 | 4 | 17 | 22 | -2 | 0 | 6 | 9 | . | -8 | 4 | 40 | 26 |
| 16 | 7 | 20 | 19 | -4 | 0 | 9 | -3 | -9 | -11 | 12 | 31 | 18 |
| 17 | . | 30 | 14 | -3 | 6 | 6 | -12 | -12 | -9 | 20 | 24 | 13 |
| 18 | . | 20 | 5 | . | 3 | 3 | -13 | -13 | 1 | 29 | 18 | 4 |
| 19 | . | 15 | -1 | 0 | 8 | 0 | -20 | -15 | 13 | 27 | 19 | 1 |
| 20 | 24 | 11 | -9 | . | 6 | -4 | . | -12 | 18 | 19 | 16 | -1 |
| 21 | 33 | 5 | -5 | 11 | 5 | . | . | -7 | 21 | 12 | 10 | 6 |
| 22 | 33 | -3 | -1 | 9 | 1 | -14 | 3 | 2 | 13 | . | 2 | 9 |
| 23 | 25 | -12 | 6 | 2 | -10 | -12 | 7 | . | 17 | 1 | -2 | 22 |
| 24 | 19 | -10 | 12 | 5 | -10 | -12 | 12 | 15 | 9 | -1 | -7 | 25 |
| 25 | 18 | -6 | 14 | -5 | -14 | -7 | 13 | 13 | 6 | 4 | -15 | 31 |
| 26 | 16 | . | 20 | 0 | -16 | -6 | 11 | 13 | 9 | -10 | -10 | 30 |
| 27 | 11 | . | 8 | -6 | -16 | 0 | 9 | 10 | 7 | -10 | 4 | 24 |
| 28 | 6 | . | 9 | -5 | -10 | 6 | 5 | 8 | 2 | -10 | 15 | 6 |
| 29 | 6 | . | 9 | -12 | -5 | 8 | | 4 | -10 | -4 | 19 | 4 |
| 30 | 8 | 4 | 4 | -8 | . | 7 | | 7 | -11 | 3 | 14 | -4 |
| 31 | 1 | | -4 | | 11 | 7 | | 6 | | 6 | | -10 |

"." indicates no data available for that day.

# JUNE 1977 DATA

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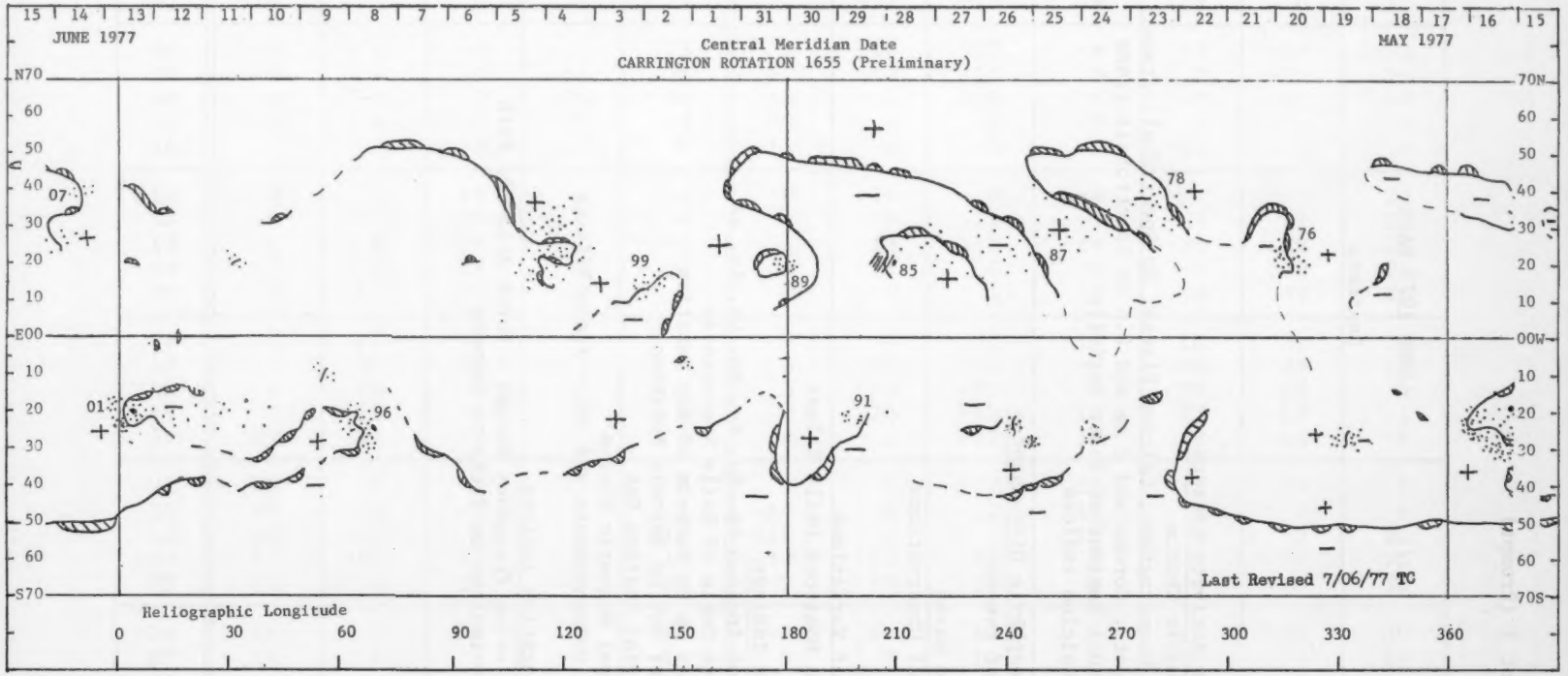
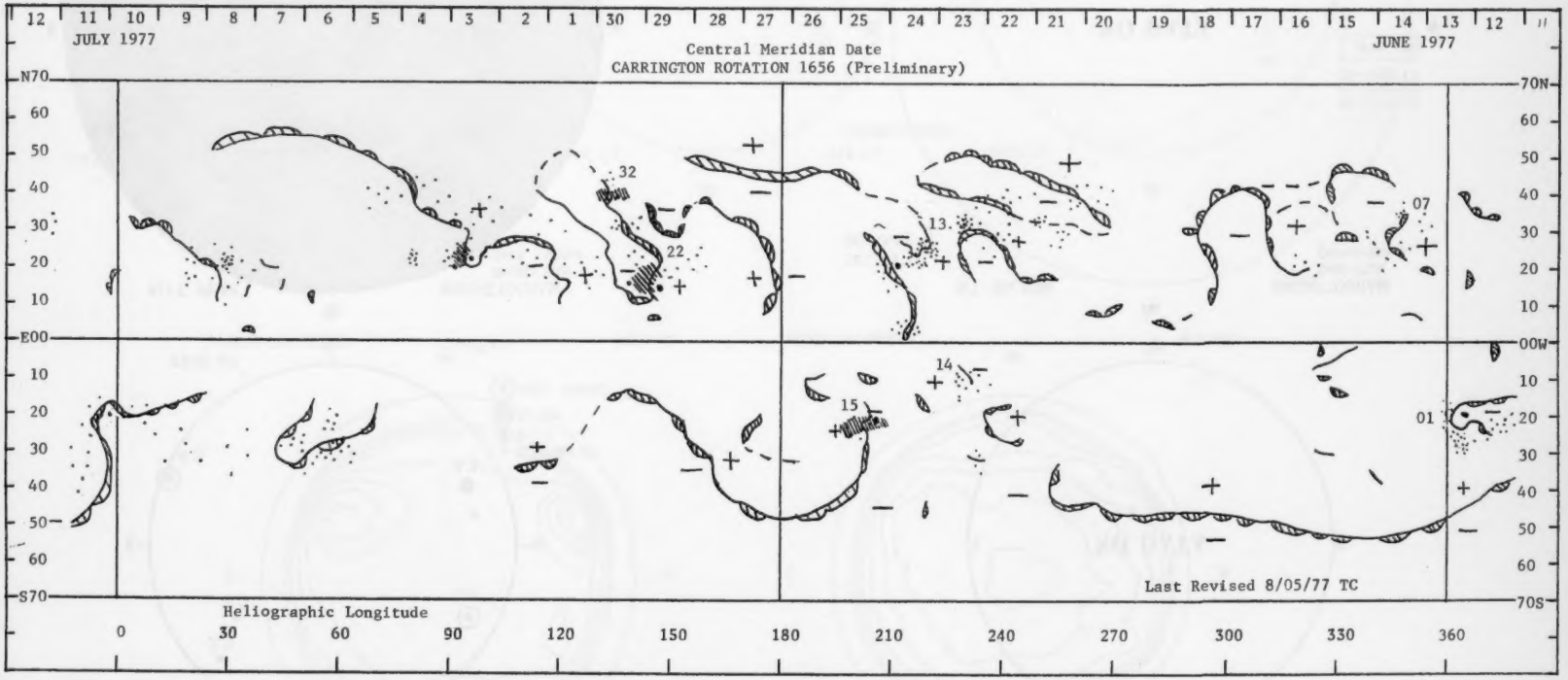
# Hα SYNOPTIC CHART

## CARRINGTON ROTATION 1655 (PRELIMINARY)



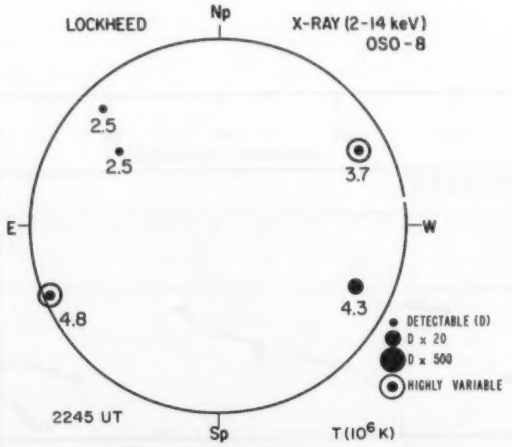
# Hα SYNOPTIC CHART

## CARRINGTON ROTATION 1656 (PRELIMINARY)

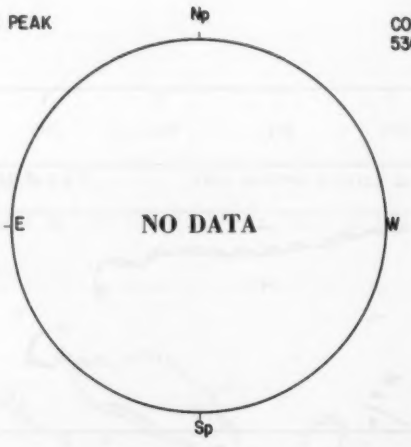


JUNE 1, 1977 (P=-15.50, $B_o$=-0.64, $L_o$=166.18)

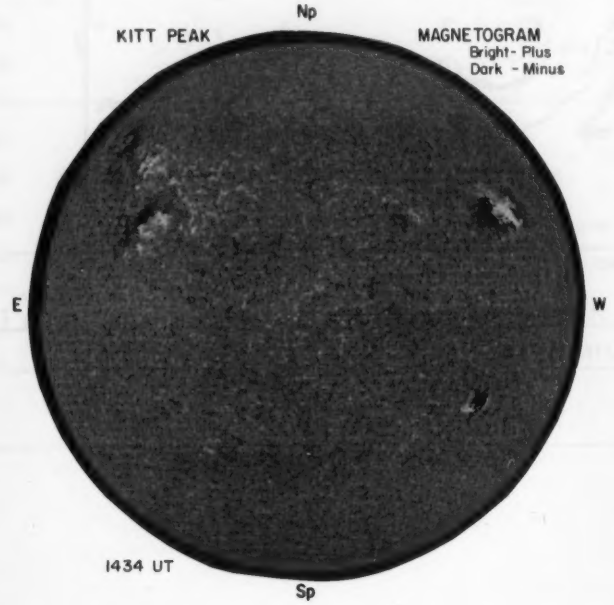
LOCKHEED X-RAY (2-14 keV) OSO-8




SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

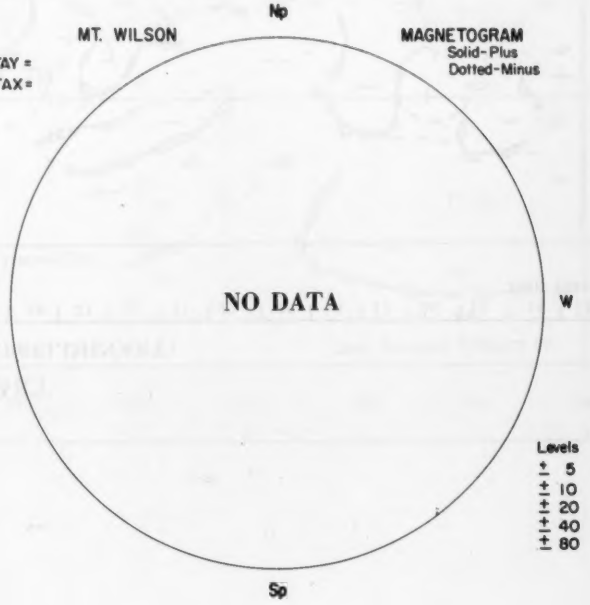



KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus



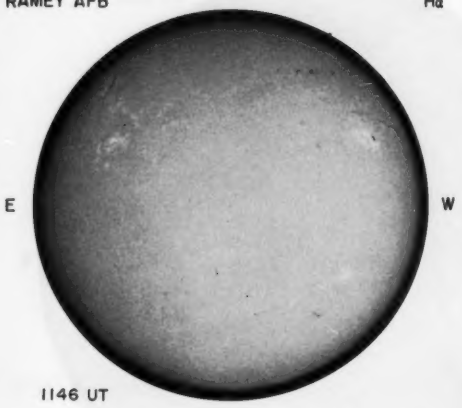

MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

DELTAY =
DELTAX =



01

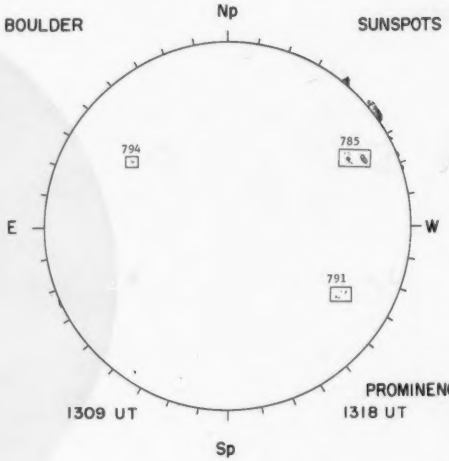
RAMEY AFB




1146 UT

Hα

BOULDER




1309 UT

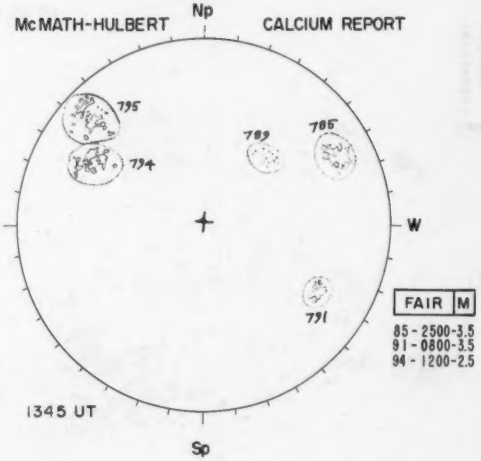
SUNSPOTS

PROMINENCES

1318 UT

McMATH-HULBERT

CALCIUM REPORT



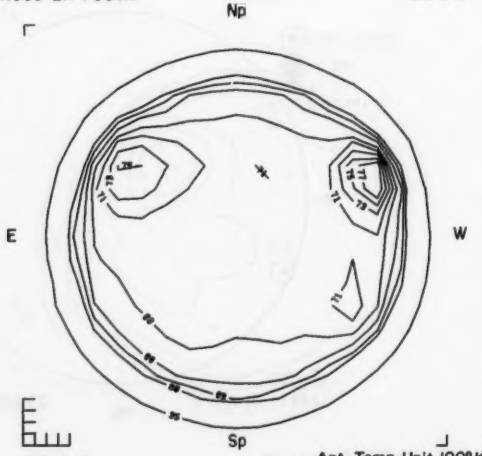

1345 UT

FAIR M

85 - 2500-3.5
91 - 0800-3.5
94 - 1200-2.5

NOSC LA POSTA

2.0 CM

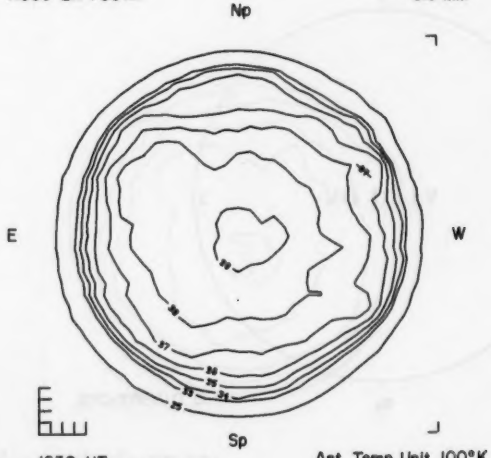



1551 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

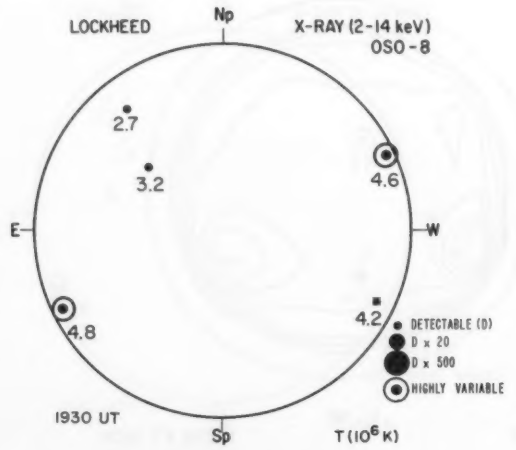
8.6 MM

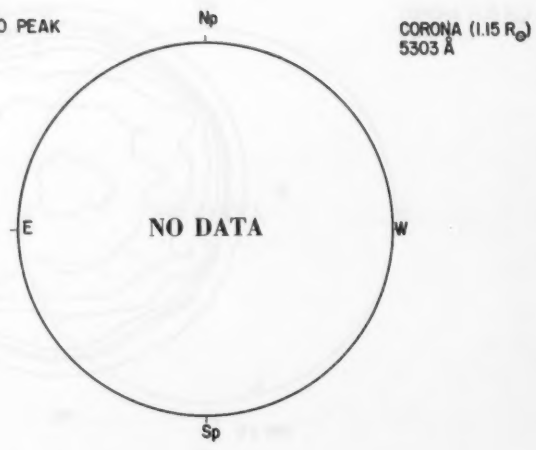


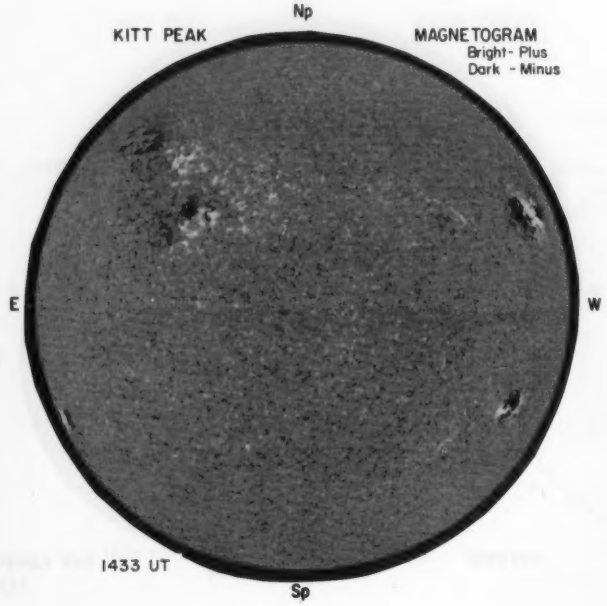

1639 UT

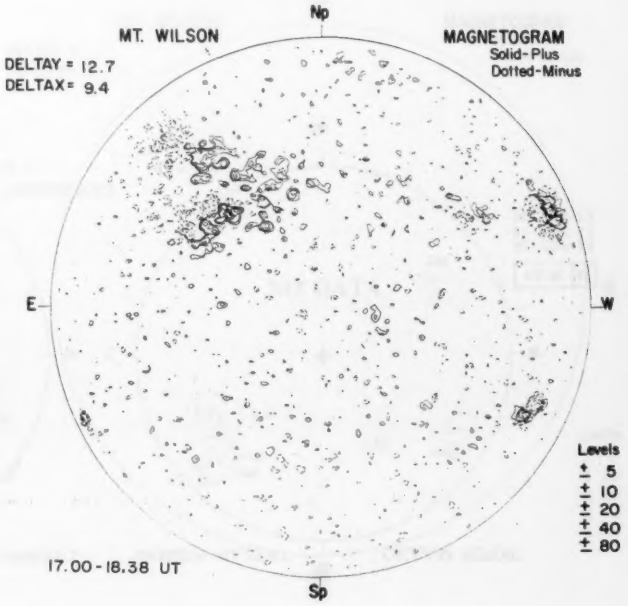
Ant. Temp. Unit 100°K

JUNE 2, 1977 (P = -15.13, $B_o$ = -0.52, $L_o$ = 152.95)



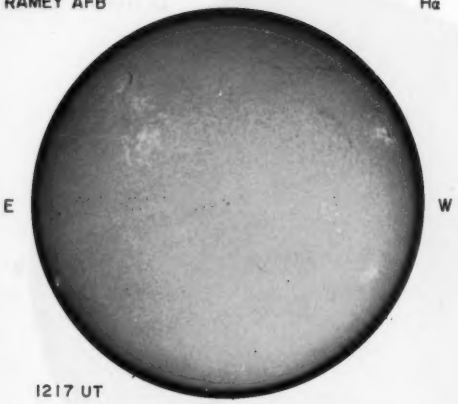



02

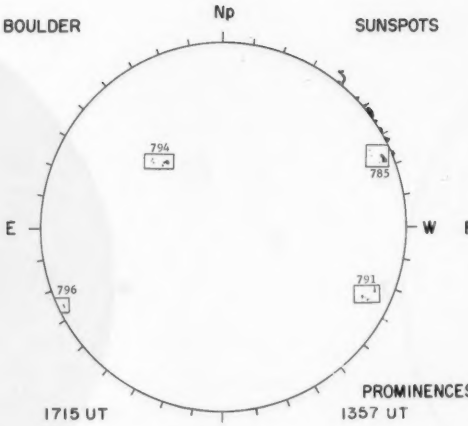
RAMEY AFB




1217 UT

Hα

BOULDER




1715 UT

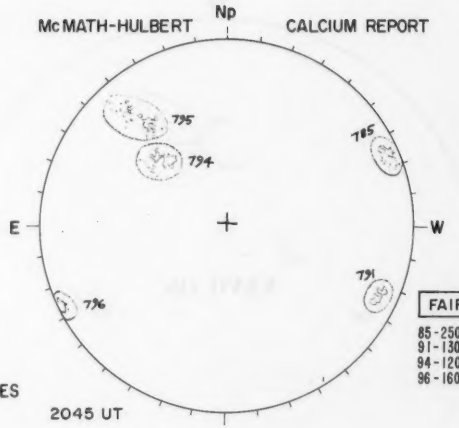
SUNSPOTS

PROMINENCES

1357 UT

McMATH-HULBERT

CALCIUM REPORT



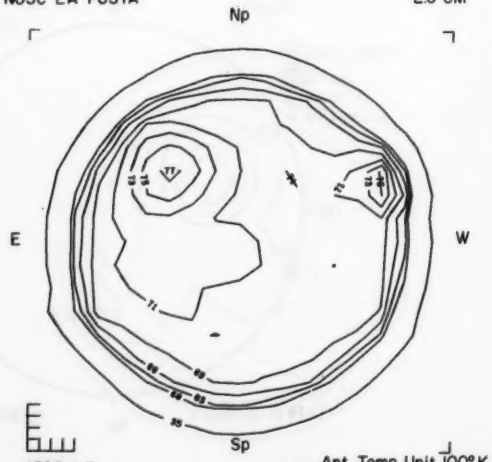

2045 UT

FAIR | M

85 - 2500 - 3.0
91 - 1300 - 3.0
94 - 1200 - 2.5
96 - 1600 - 4.0

NOSC LA POSTA

2.0 CM

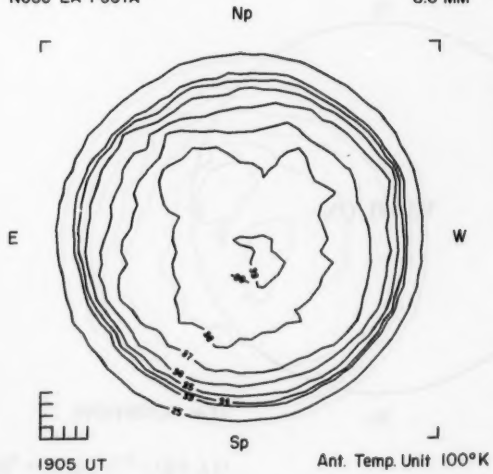



1822 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

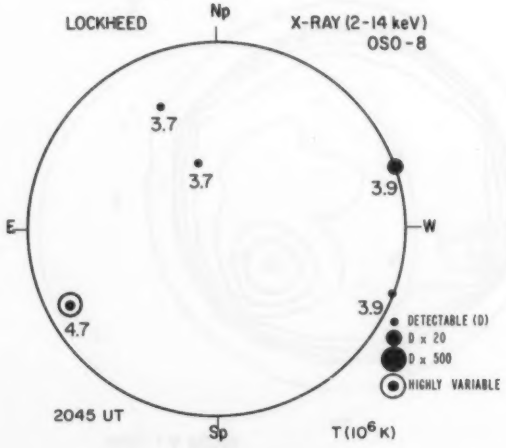



1905 UT

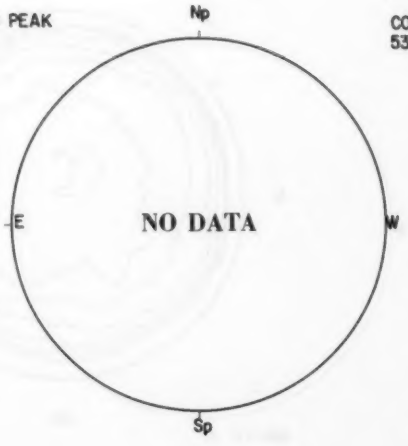
Ant. Temp. Unit 100°K

JUNE 3, 1977 (P = -14.75, $B_o$ = -0.40, $L_o$ = 139.71)

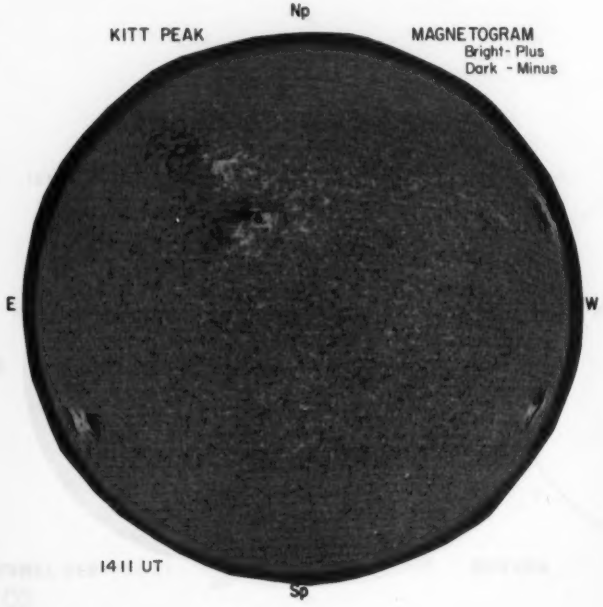
LOCKHEED X-RAY (2-14 keV) OSO-8




SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

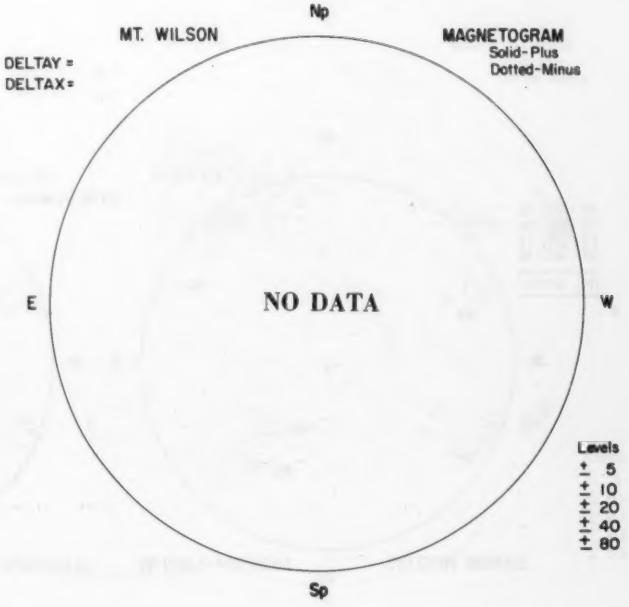



KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus



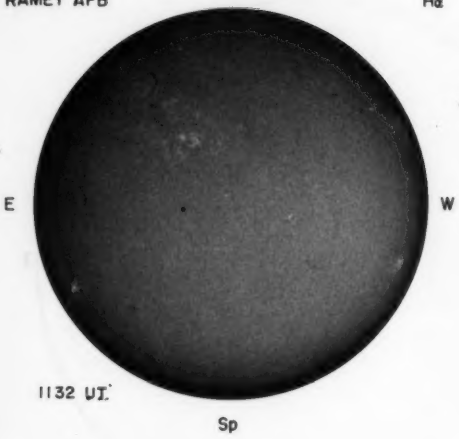

MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

DELTAY =
DELTAX =



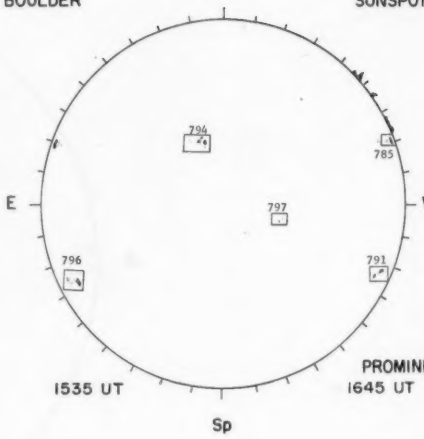
03

RAMEY AFB




1132 UT

Hα BOULDER




1535 UT

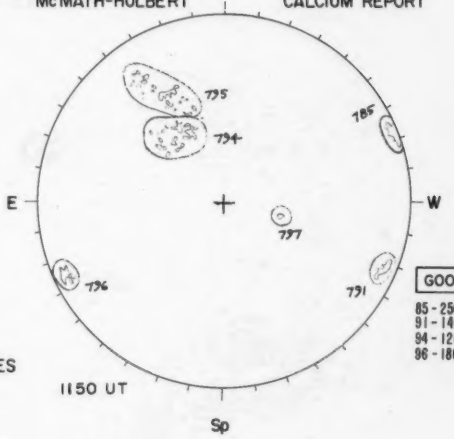
SUNSPOTS

PROMINENCES

1645 UT

McMATH-HULBERT

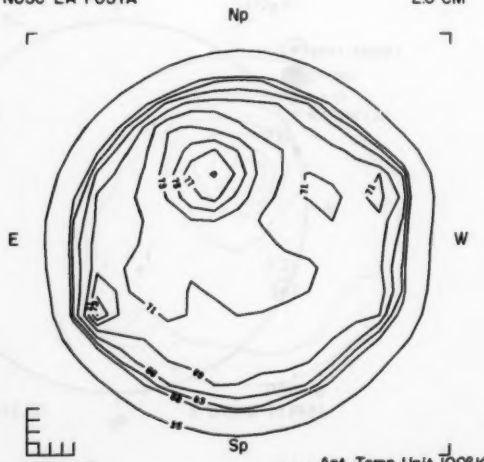
CALCIUM REPORT




1150 UT

| GOOD | S |
|---|---|
| 85 - 2500 - 3.5 | |
| 91 - 1400 - 3.0 | |
| 94 - 1200 - 2.5 | |
| 96 - 1800 - 4.0 | |

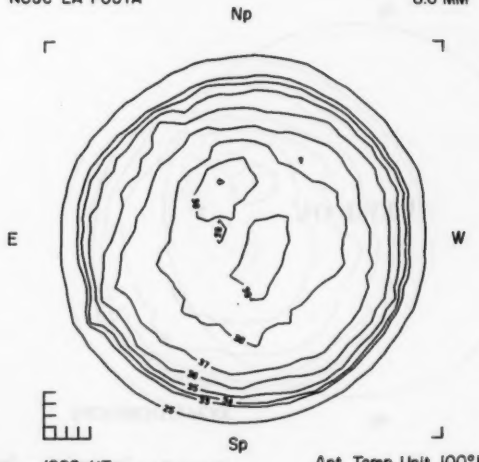
NOSC LA POSTA 2.0 CM




1800 UT

Ant. Temp. Unit 100°K

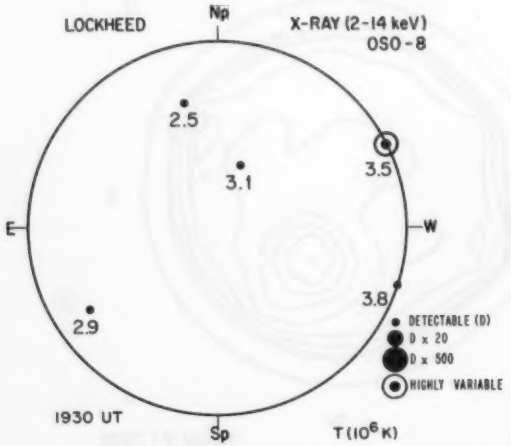
NOSC LA POSTA 8.6 MM

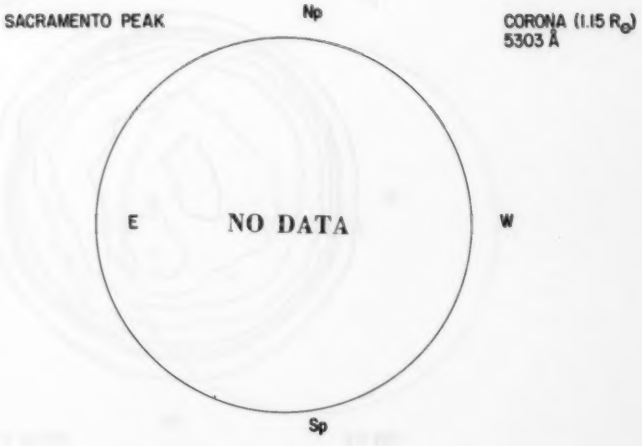


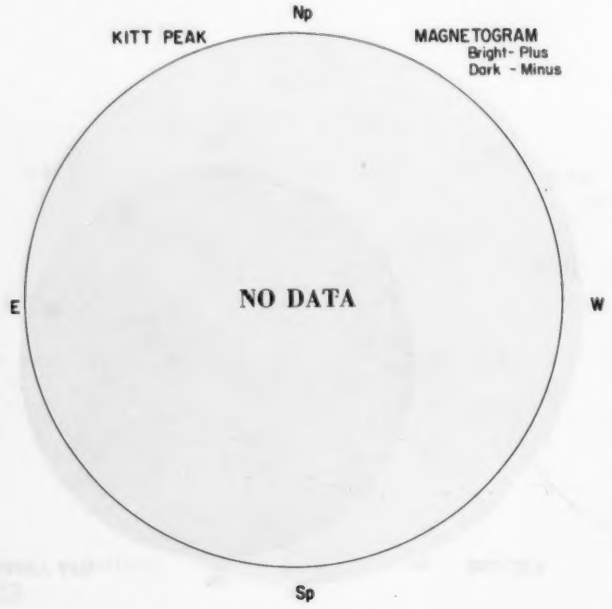

1902 UT

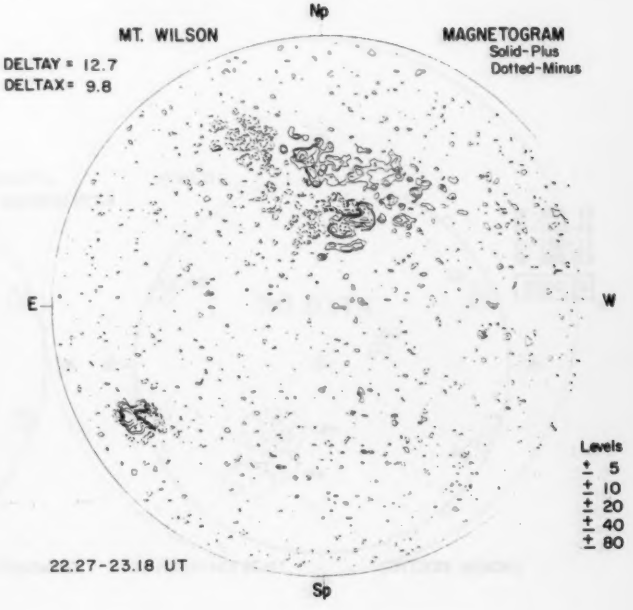
Ant. Temp. Unit 100°K

JUNE 4, 1977 (P = -14.36, $B_0$ = -0.28, $L_0$ = 126.48)



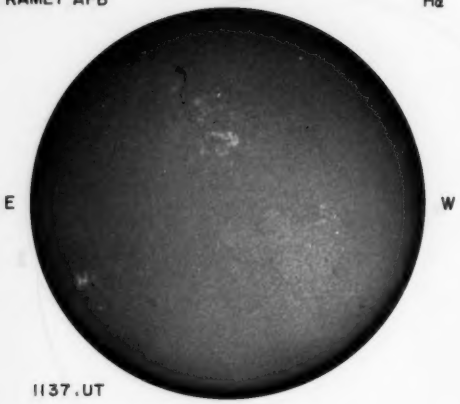



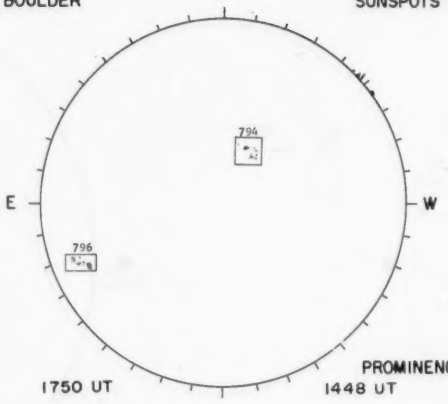
04

RAMEY AFB




1137 UT

Hα BOULDER

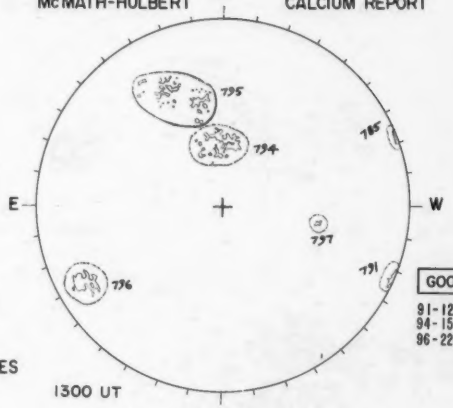



1750 UT

SUNSPOTS

1448 UT

McMATH-HULBERT




1300 UT

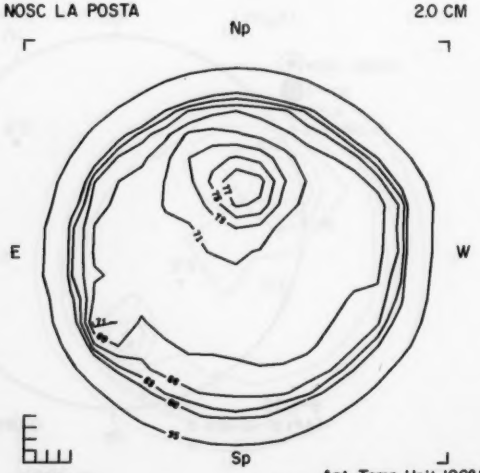
CALCIUM REPORT

| GOOD | M |
|---|---|

91 - 1200 - 2.5
94 - 1500 - 3.0
96 - 2200 - 4.0

PROMINENCES

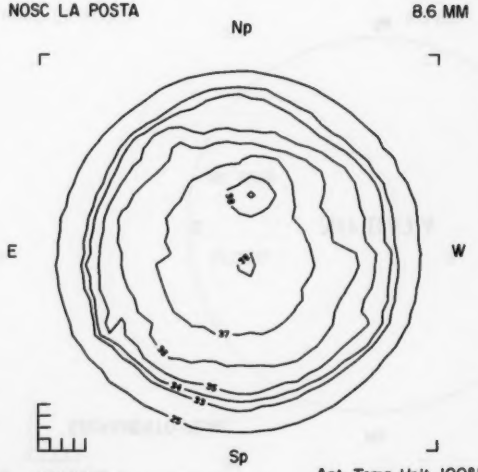
NOSC LA POSTA 2.0 CM




1506 UT

Ant. Temp. Unit 100°K

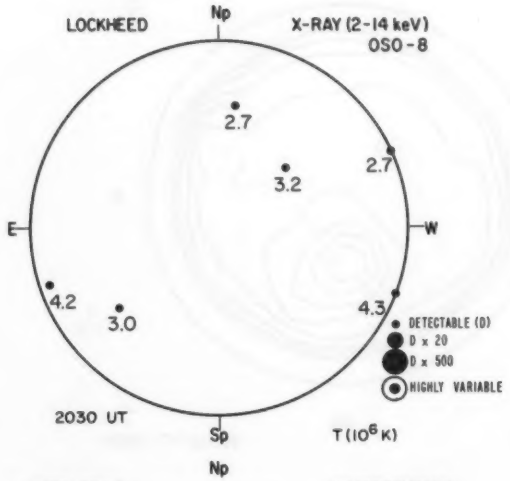
NOSC LA POSTA 8.6 MM

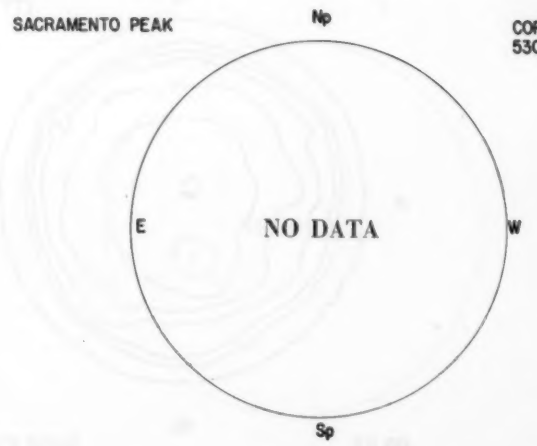


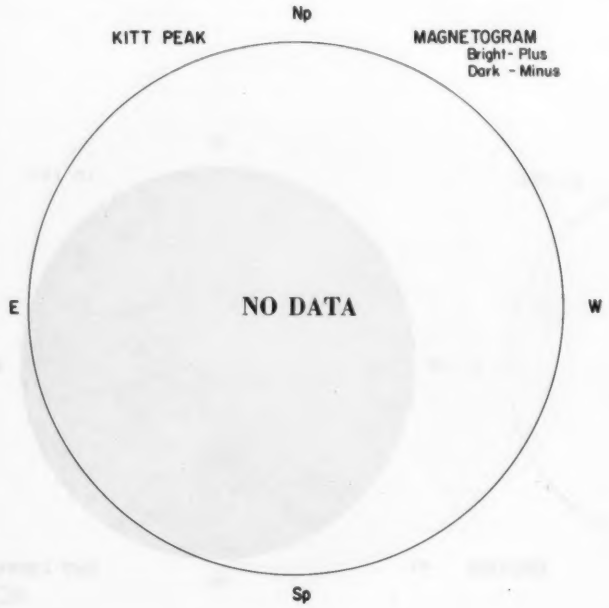

1540 UT

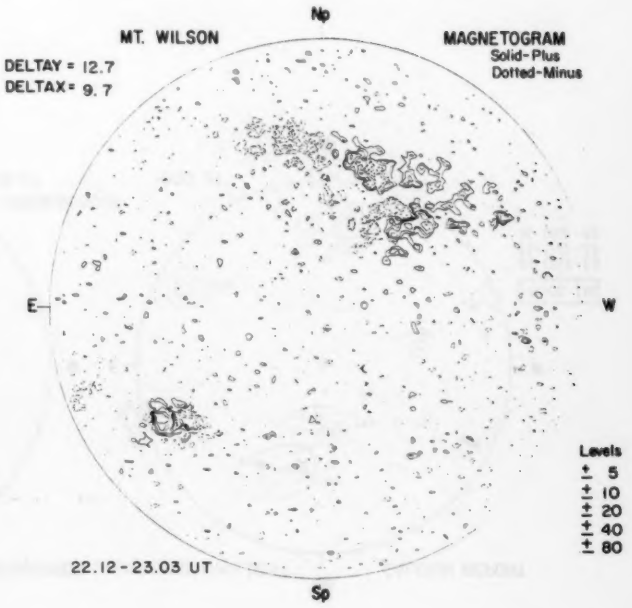
Ant. Temp. Unit 100°K

# JUNE 5, 1977 (P=-13.97, $B_0$=-0.15, $L_0$=113.24)



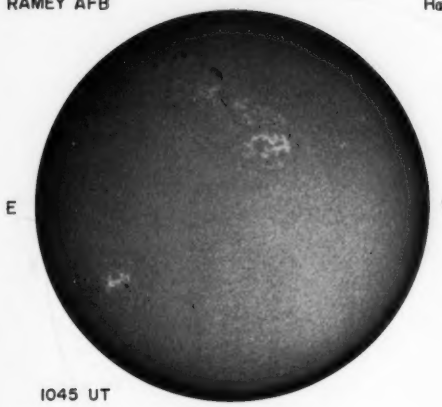



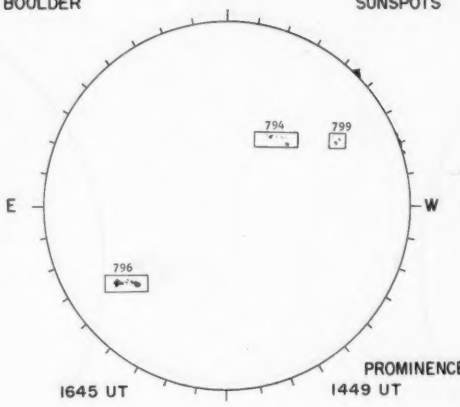
05

RAMEY AFB




1045 UT

Hα BOULDER



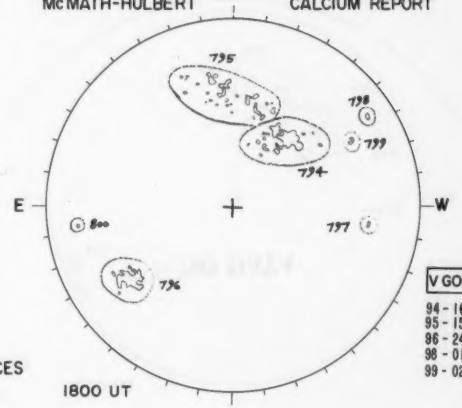

1645 UT

SUNSPOTS

PROMINENCES

1449 UT

McMATH-HULBERT



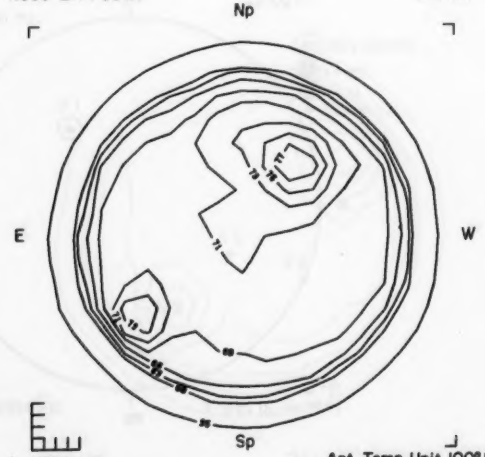

1800 UT

CALCIUM REPORT

| V GOOD | S |
|---|---|

94 - 1600 - 3.0
95 - 1500 - 2.5
96 - 2400 - 4.0
98 - 0100 - 2.5
99 - 0200 - 3.0

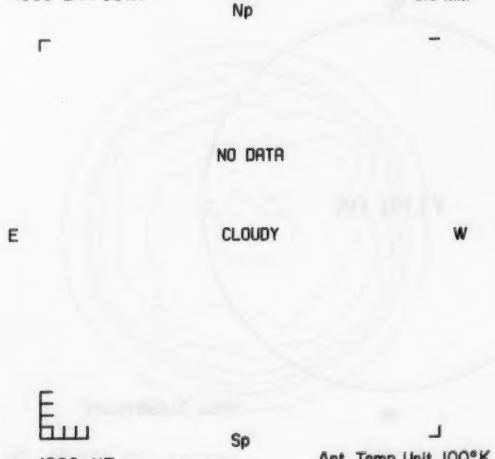
NOSC LA POSTA 2.0 CM




1734 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

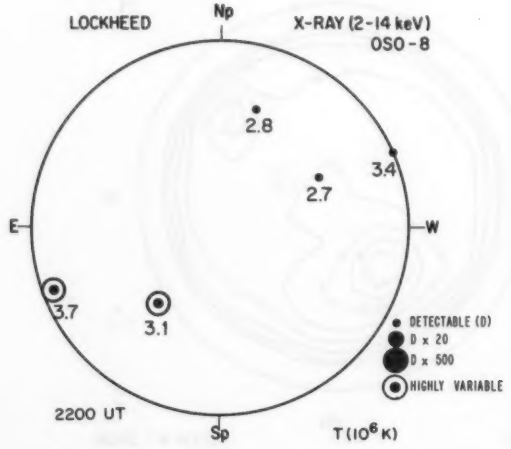



1822 UT

Ant. Temp. Unit 100°K

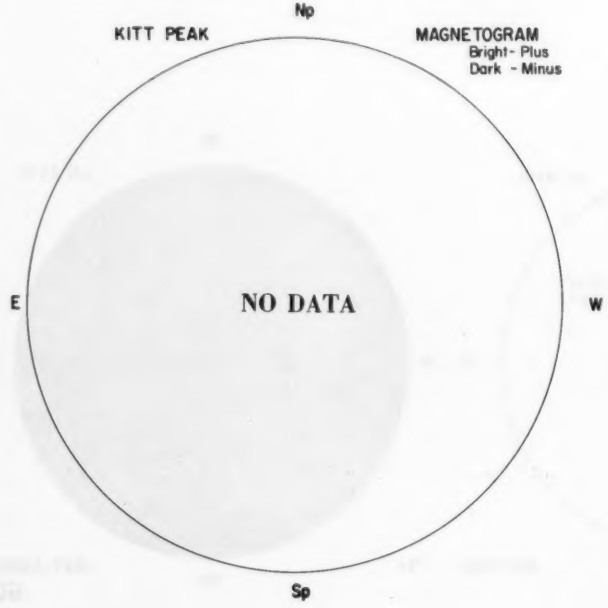
JUNE 6, 1977 (P=-13.58, $B_o$=-0.03, $L_o$=100.01)

LOCKHEED X-RAY (2-14 keV) OSO-8

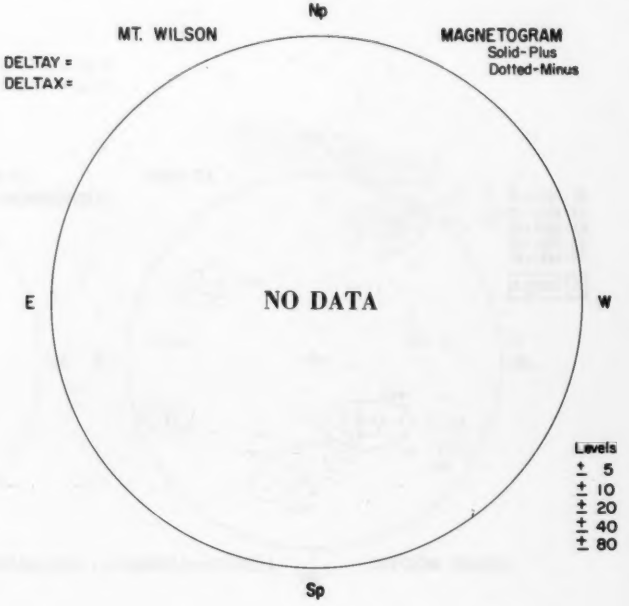



SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

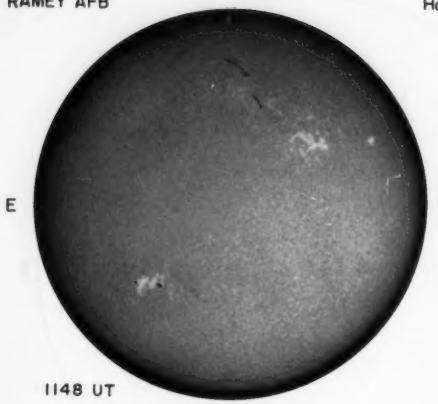



MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY =
DELTAX =



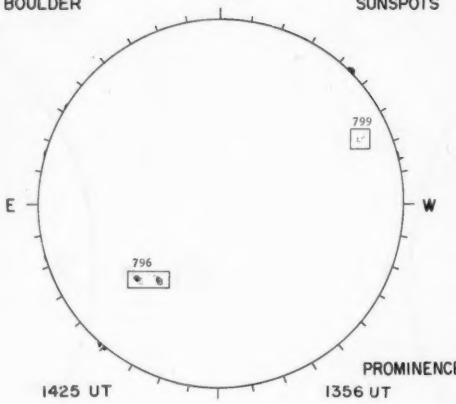
06

RAMEY AFB




1148 UT

Hα BOULDER



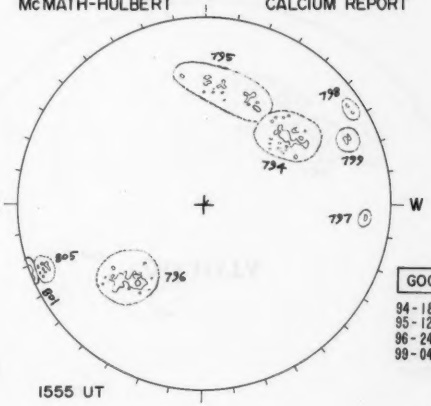

1425 UT

SUNSPOTS

1356 UT

PROMINENCES

McMATH-HULBERT



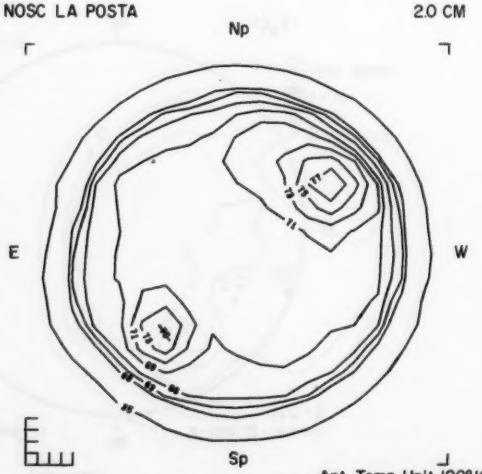

1555 UT

CALCIUM REPORT

| GOOD | S |
|---|---|

94 - 1800 - 3.5
95 - 1200 - 3.0
96 - 2400 - 4.0
99 - 0400 - 3.5

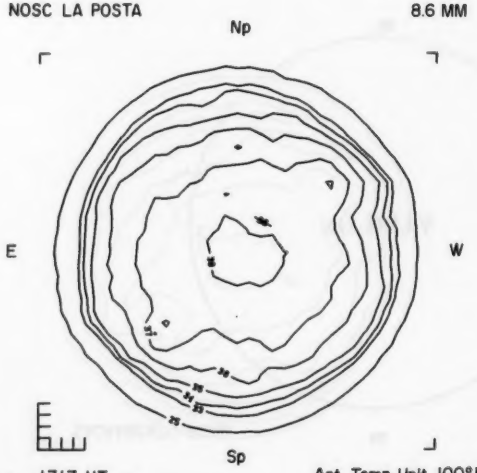
NOSC LA POSTA 2.0 CM




1620 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

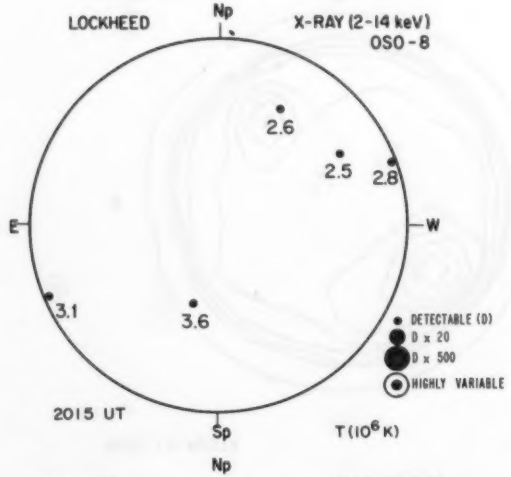



1717 UT

Ant. Temp. Unit 100°K

JUNE 7, 1977 (P = -13.18, $B_o$ = 0.09, $L_o$ = 86.77)

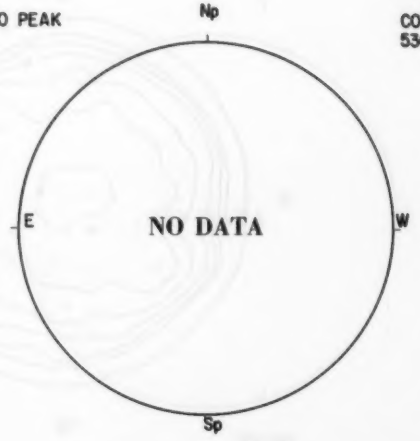
LOCKHEED X-RAY (2-14 keV) OSO-8



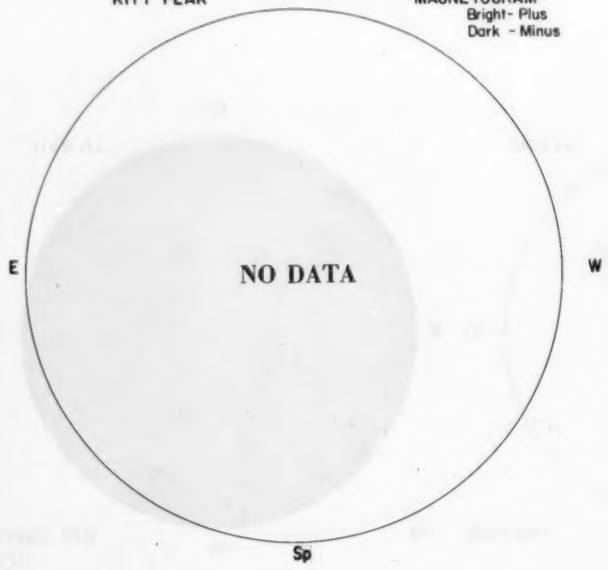

2015 UT

T($10^6$ K)

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

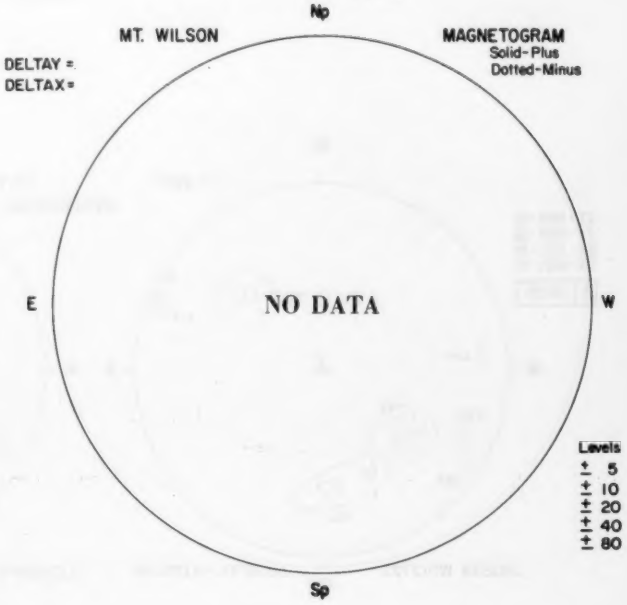



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



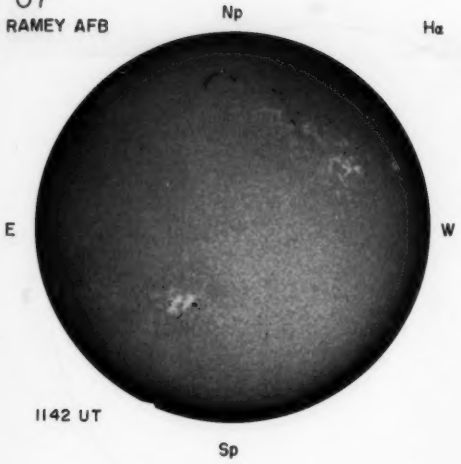

MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY =
DELTAX =



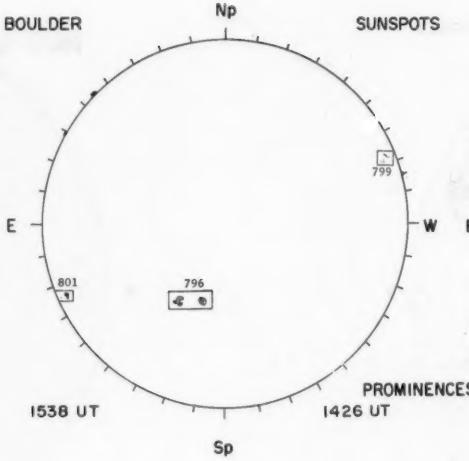
07

RAMEY AFB




1142 UT

Hα BOULDER




1538 UT

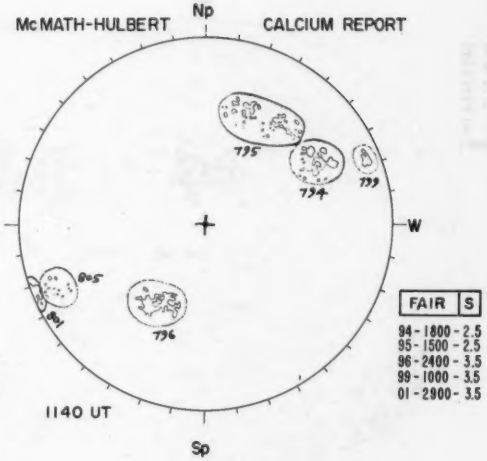
SUNSPOTS

PROMINENCES

1426 UT

McMATH-HULBERT

CALCIUM REPORT

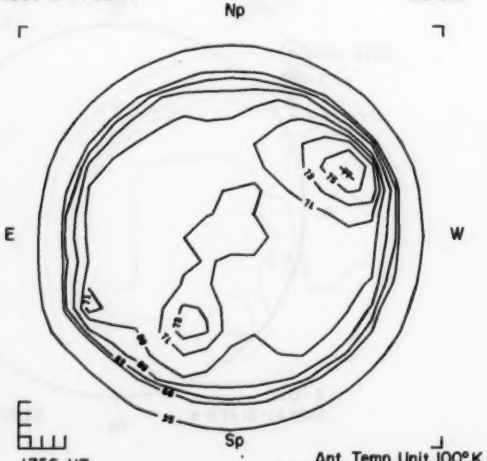



1140 UT

FAIR | S

94 - 1800 - 2.5
95 - 1500 - 2.5
96 - 2400 - 3.5
99 - 1000 - 3.5
01 - 2900 - 3.5

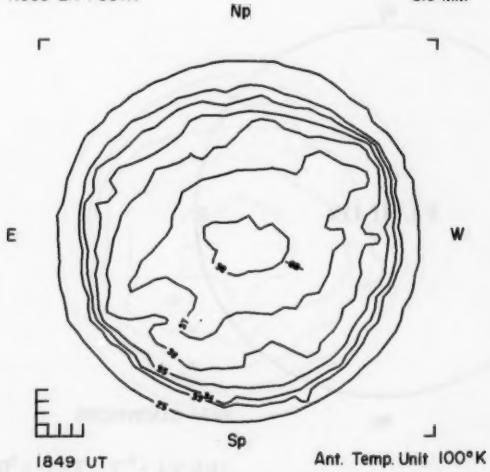
NOSC LA POSTA 2.0 CM




1756 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

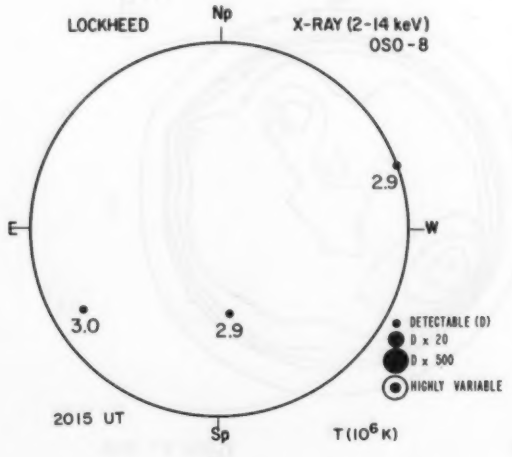



1849 UT

Ant. Temp. Unit 100°K

JUNE 8, 1977 (P = -12.78, $B_0$ = 0.21, $L_0$ = 73.54)

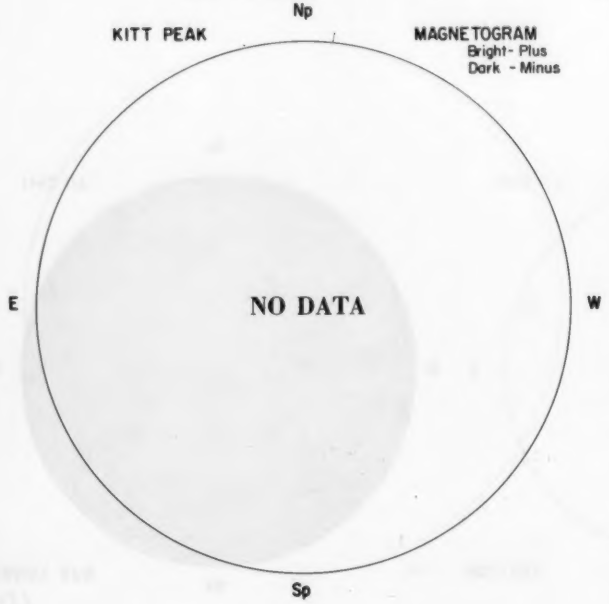
LOCKHEED X-RAY (2-14 keV) OSO-8




2015 UT T($10^6$ K)

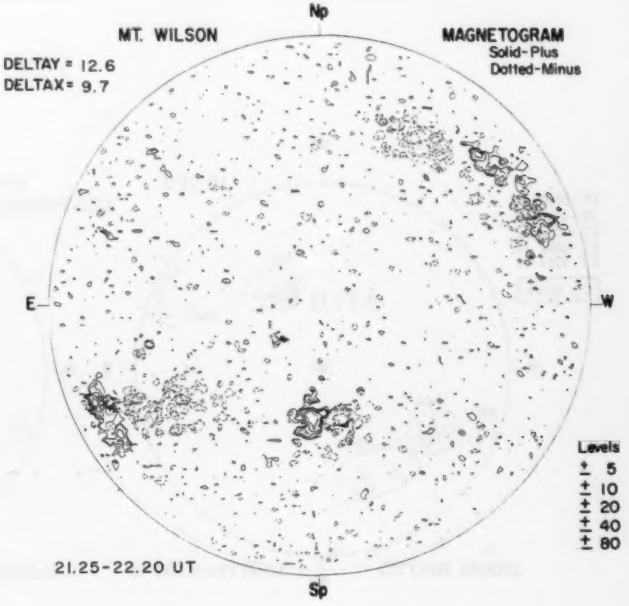
SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus




MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

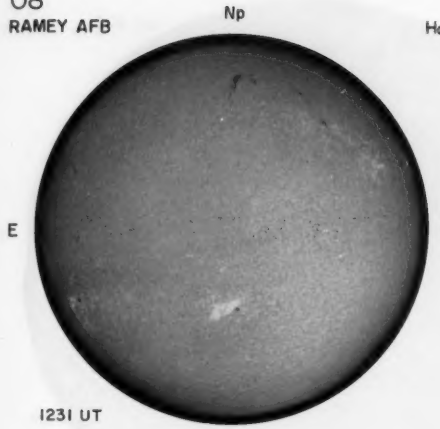
DELTAY = 12.6
DELTAX = 9.7




21.25-22.20 UT

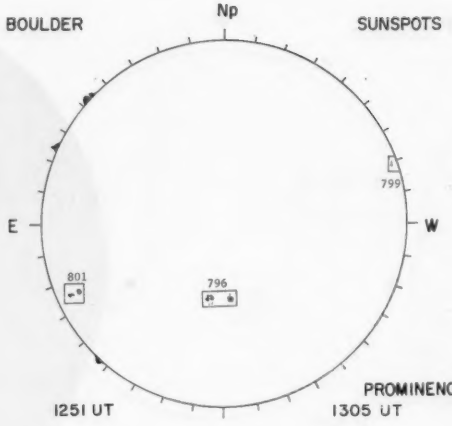
08

RAMEY AFB




1231 UT

Hα BOULDER




1251 UT

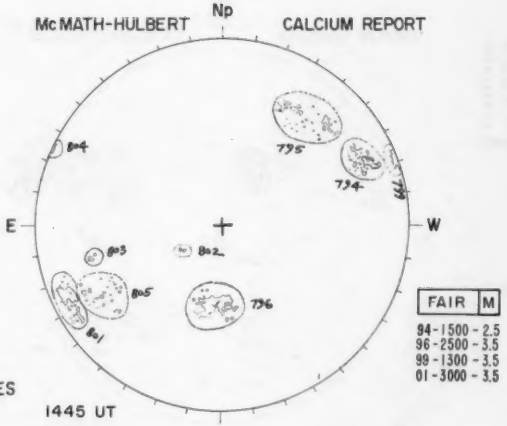
SUNSPOTS

PROMINENCES

1305 UT

McMATH-HULBERT

CALCIUM REPORT

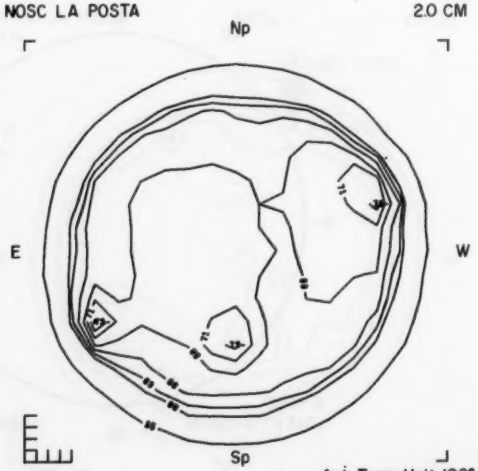



1445 UT

| FAIR | M |
|---|---|

94 - 1500 - 2.5
96 - 2500 - 3.5
99 - 1300 - 3.5
01 - 3000 - 3.5

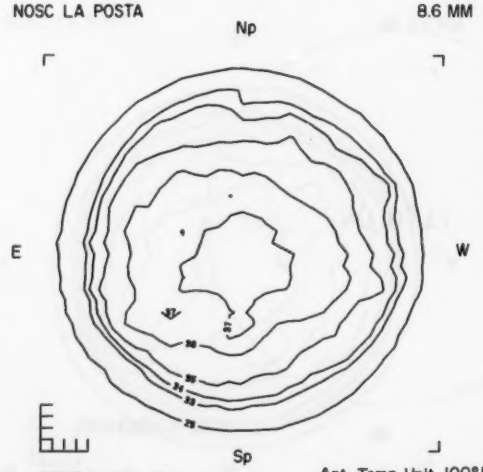
NOSC LA POSTA 2.0 CM




1524 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



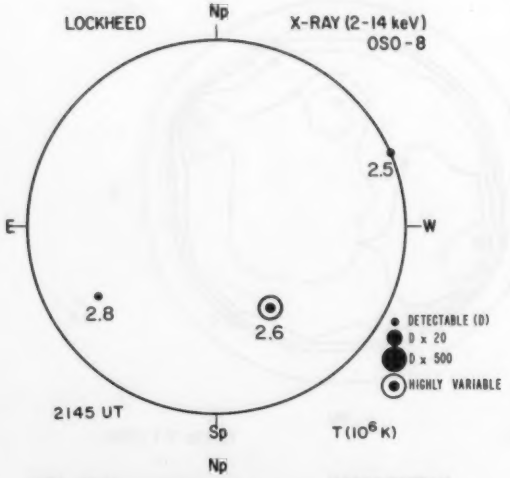

1637 UT

Ant. Temp. Unit 100°K

# JUNE 9, 1977 (P = -12.37, $B_o$ = 0.33, $L_o$ = 60.30)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

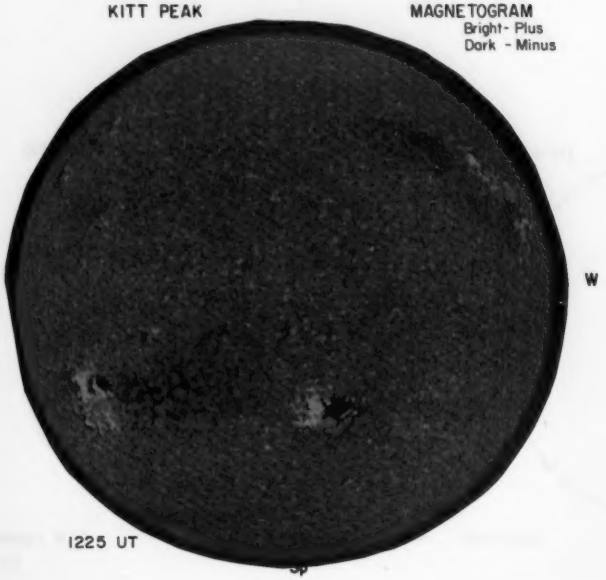



SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

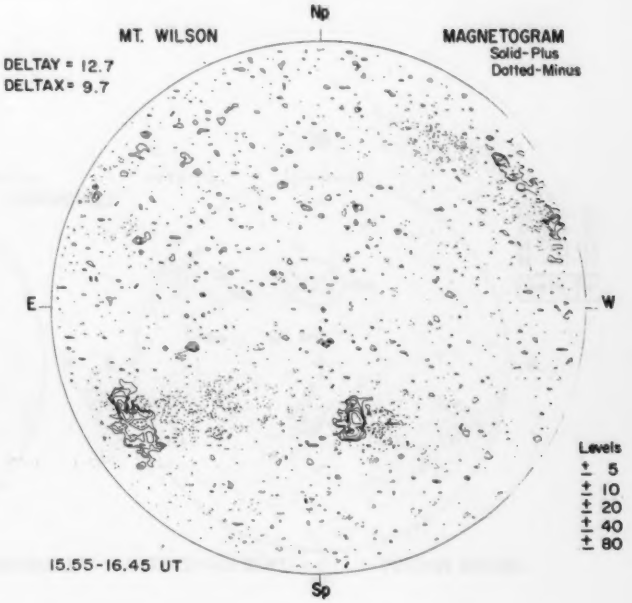
MAGNETOGRAM
Bright - Plus
Dark - Minus




MT. WILSON

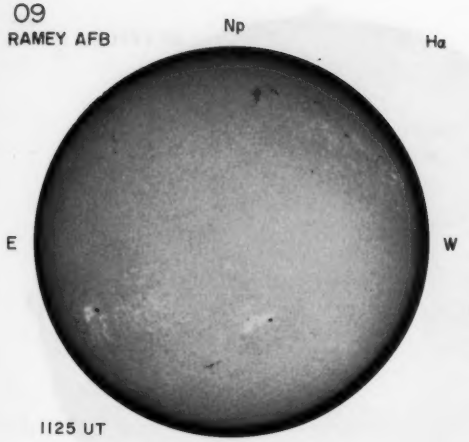
MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY = 12.7
DELTAX = 9.7



09

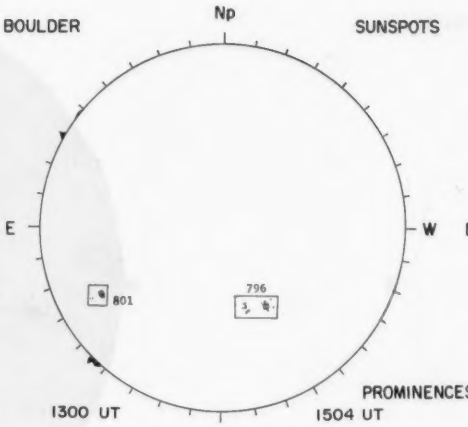
RAMEY AFB




1125 UT

Hα

BOULDER




1300 UT

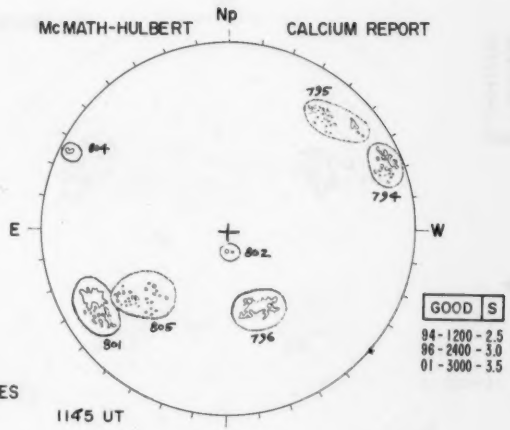
SUNSPOTS

PROMINENCES

1504 UT

McMATH-HULBERT

CALCIUM REPORT



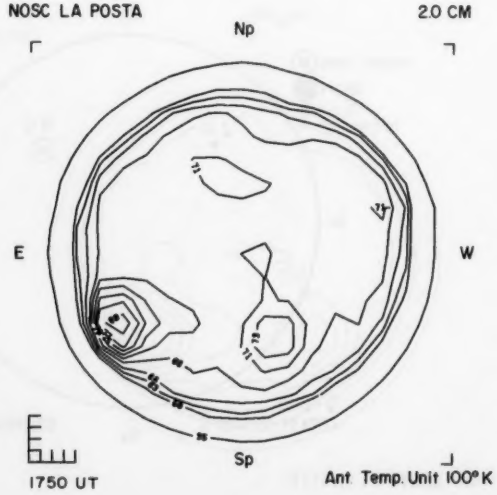

1145 UT

GOOD | S

94 - 1200 - 2.5
96 - 2400 - 3.0
01 - 3000 - 3.5

NOSC LA POSTA

2.0 CM

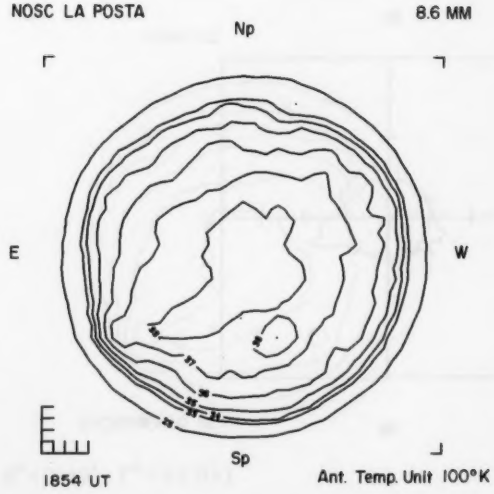



1750 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



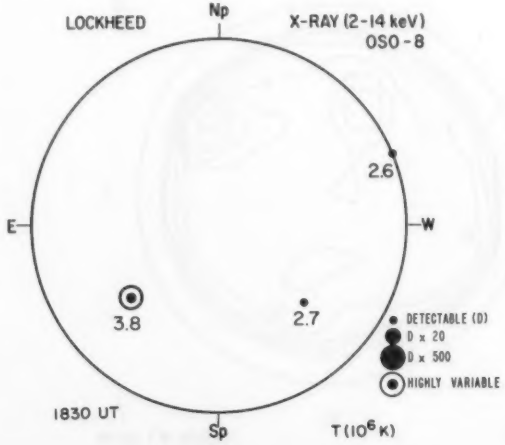

1854 UT

Ant. Temp. Unit 100°K

# JUNE 10, 1977 (P = -11.96, $B_o$ = 0.45, $L_o$ = 47.07)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

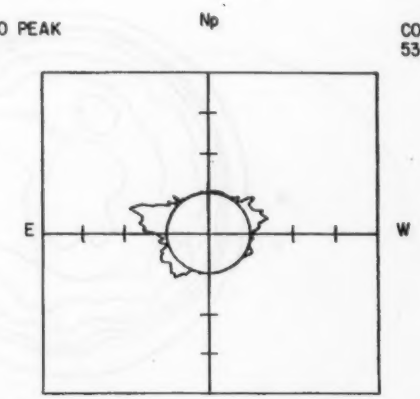



1830 UT

T($10^6$ K)

SACRAMENTO PEAK

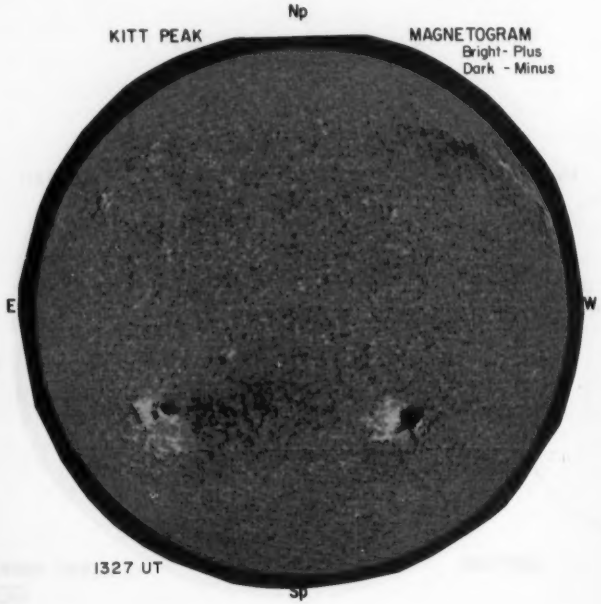
CORONA (1.15 $R_\odot$)
5303 Å




2235 UT

KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

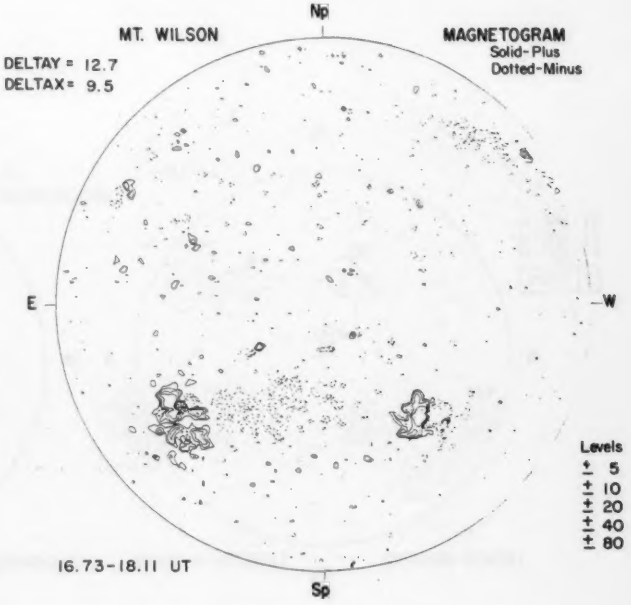



1327 UT

MT. WILSON

DELTAY = 12.7
DELTAX = 9.5

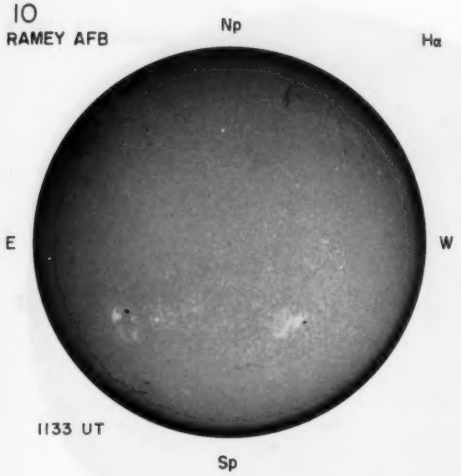
MAGNETOGRAM
Solid - Plus
Dotted - Minus




16.73-18.11 UT

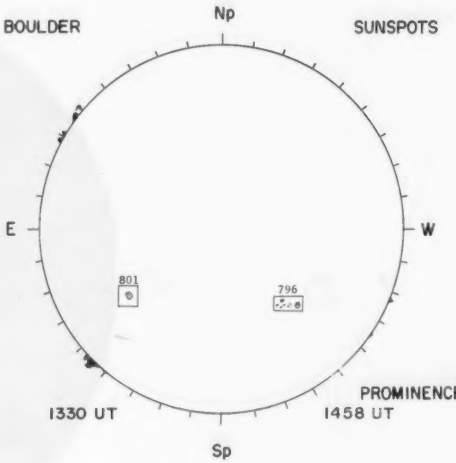
10

RAMEY AFB Hα




1133 UT

BOULDER SUNSPOTS

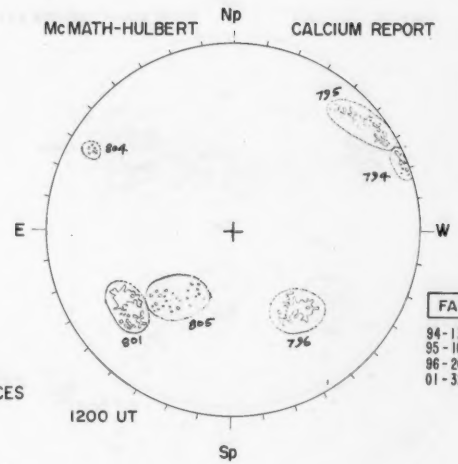



1330 UT

PROMINENCES

1458 UT

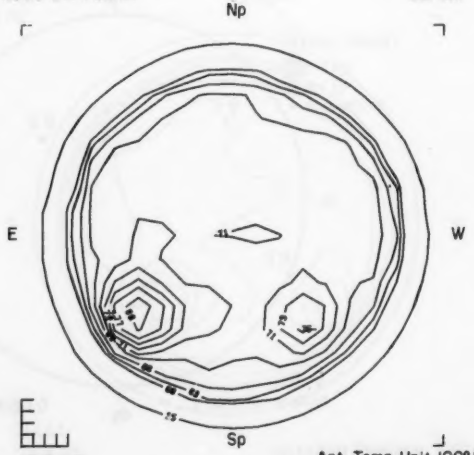
McMATH-HULBERT CALCIUM REPORT




1200 UT

| FAIR | D |
|---|---|
| 94 - 1300 - 2.5 | |
| 95 - 1000 - 2.5 | |
| 96 - 2600 - 3.0 | |
| 01 - 3200 - 3.5 | |

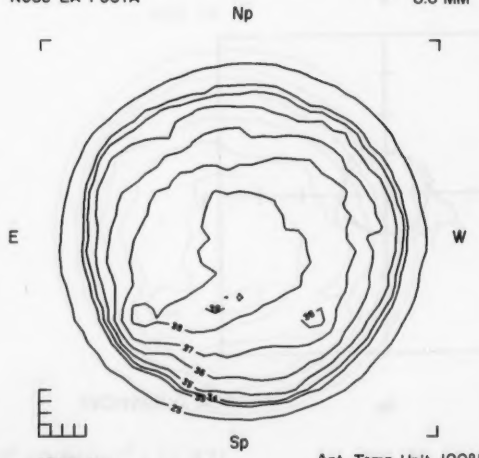
NOSC LA POSTA 2.0 CM




1713 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



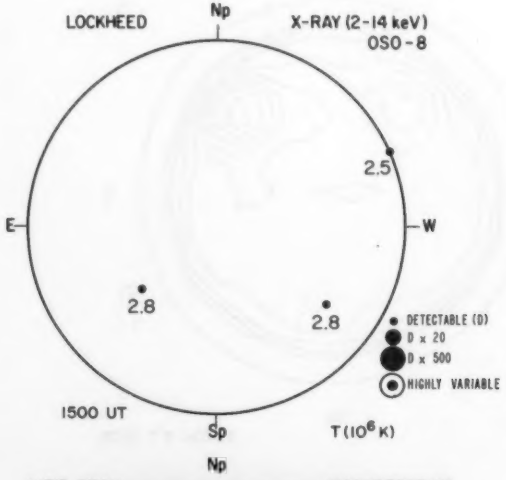

1843 UT

Ant. Temp. Unit 100°K

JUNE 11, 1977 (P=-11.55, $B_o$=0.57, $L_o$=33.83)

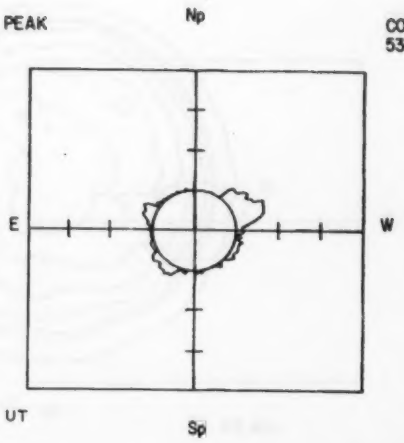
LOCKHEED

X-RAY (2-14 keV)
OSO-8



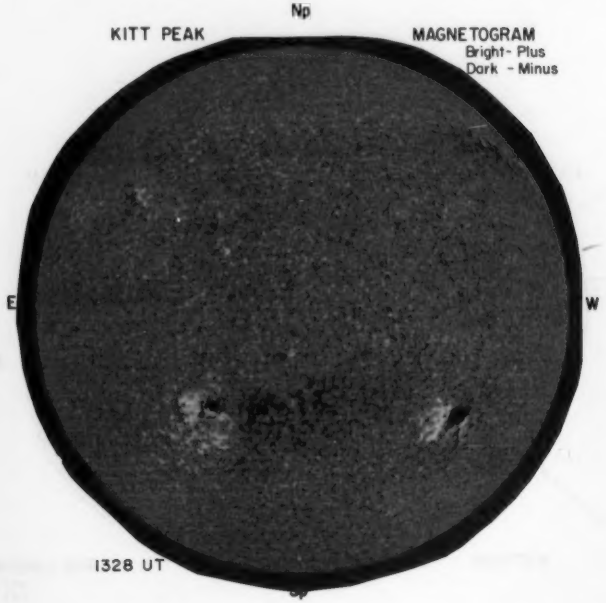

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å




KITT PEAK

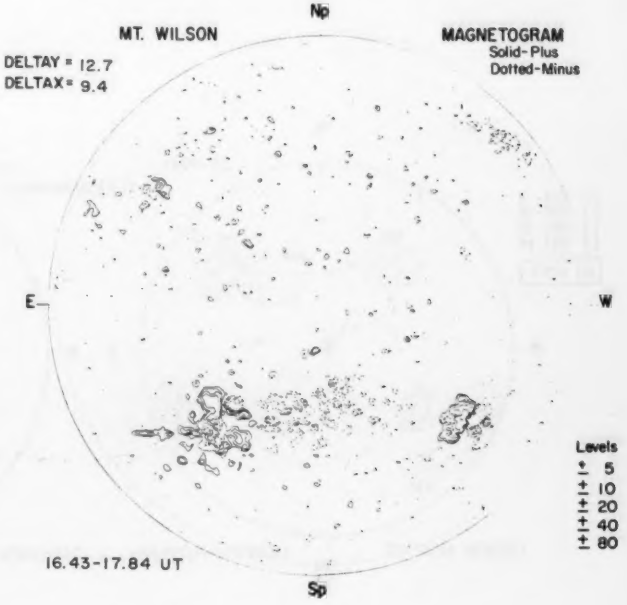
MAGNETOGRAM
Bright- Plus
Dark - Minus

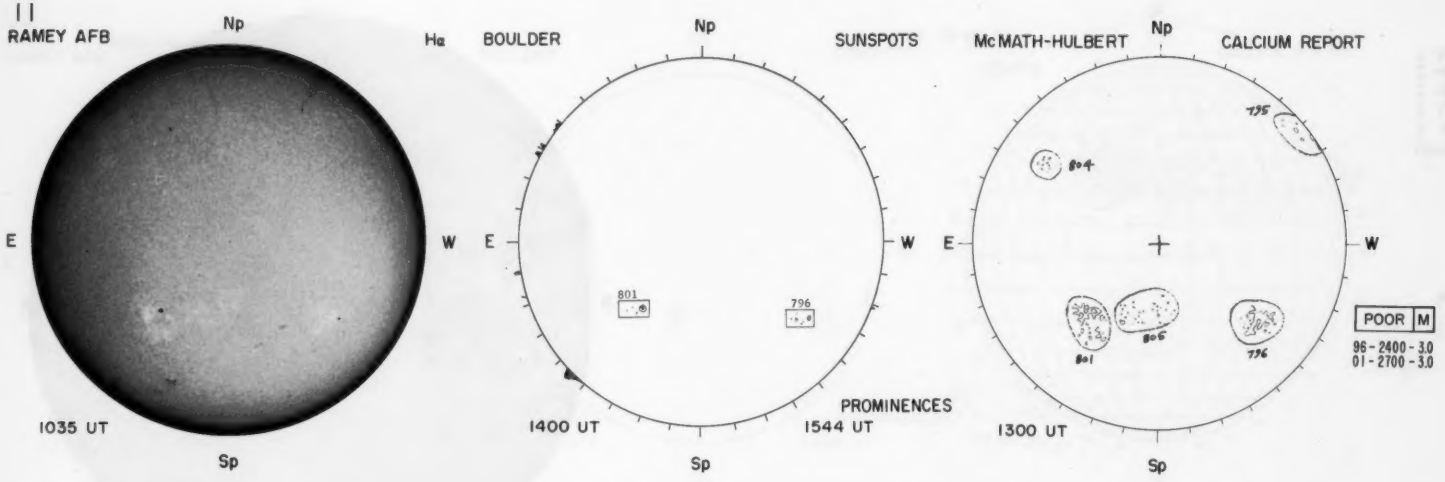


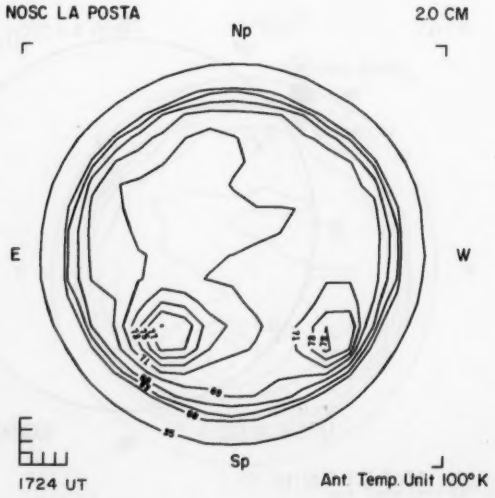

MT. WILSON

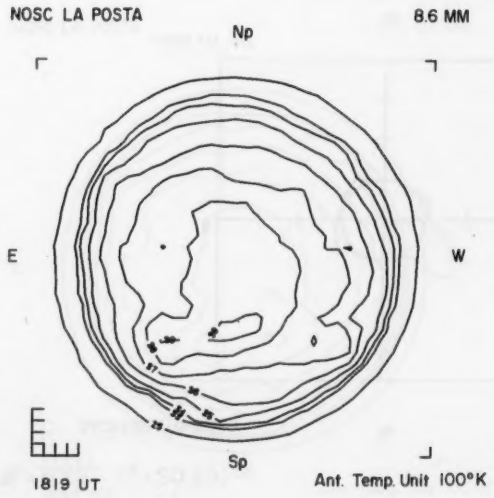
DELTAY = 12.7
DELTAX= 9.4

MAGNETOGRAM
Solid- Plus
Dotted-Minus




RAMEY AFB
Np
Hα
E
W
Sp
1035 UT
BOULDER
SUNSPOTS
801
796
1400 UT
1544 UT
PROMINENCES
McMATH-HULBERT
CALCIUM REPORT
804
735
806
801
776
POOR M
96 - 2400 - 3.0
01 - 2700 - 3.0
1300 UT

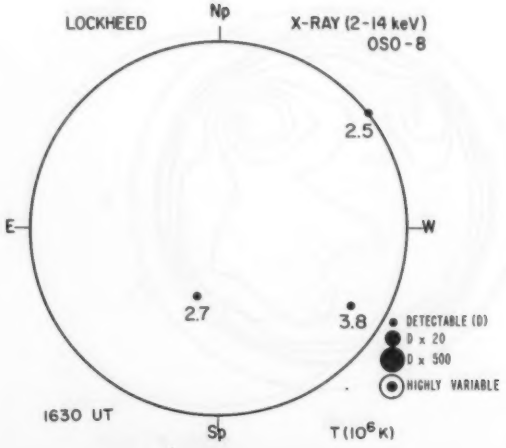

NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1724 UT
Ant. Temp. Unit 100°K


NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1819 UT
Ant. Temp. Unit 100°K

# JUNE 12, 1977 (P = -11.13, $B_0$ = 0.69, $L_0$ = 20.59)

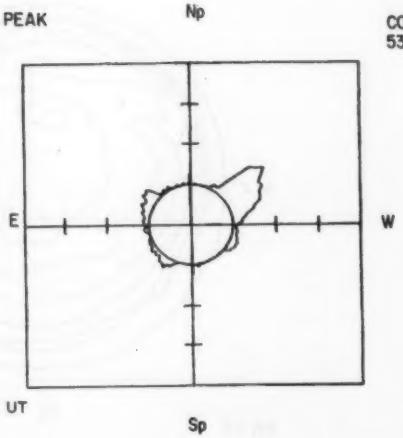
LOCKHEED

X-RAY (2-14 keV)
OSO-8



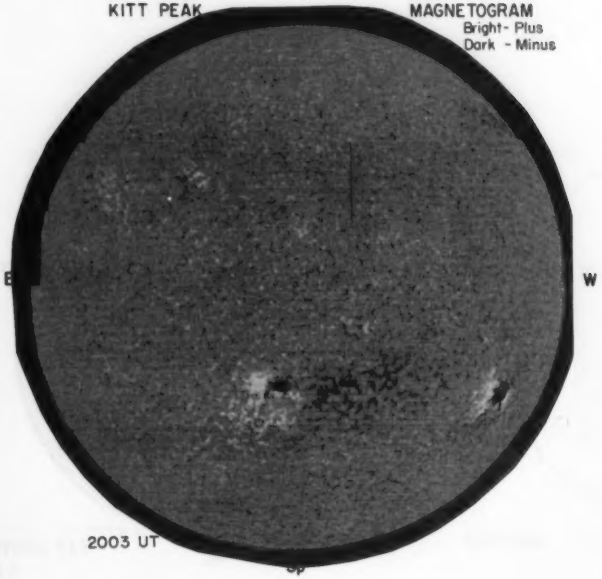

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å




KITT PEAK

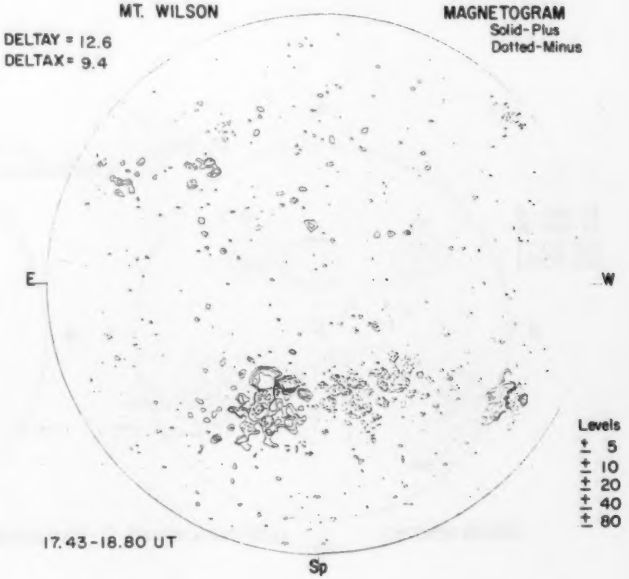
MAGNETOGRAM
Bright - Plus
Dark - Minus




MT. WILSON

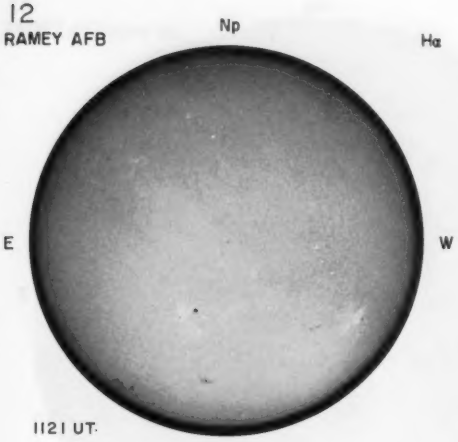
MAGNETOGRAM
Solid - Plus
Dotted - Minus

DELTAY = 12.6
DELTAX = 9.4



12

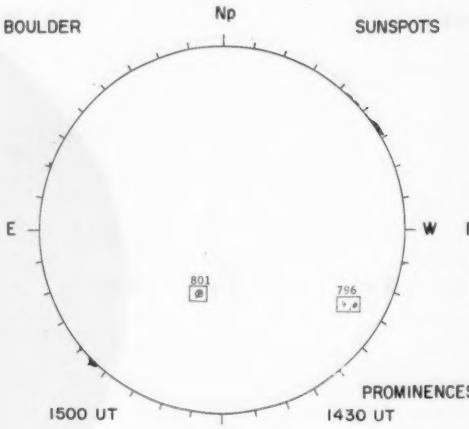
RAMEY AFB




1121 UT

Hα

BOULDER



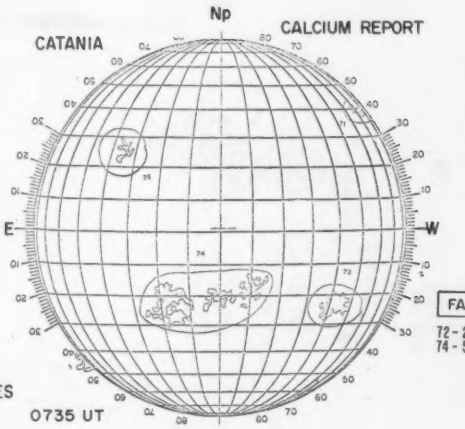

1500 UT

SUNSPOTS

1430 UT

CATANIA

CALCIUM REPORT




FAIR SS

72-2647---

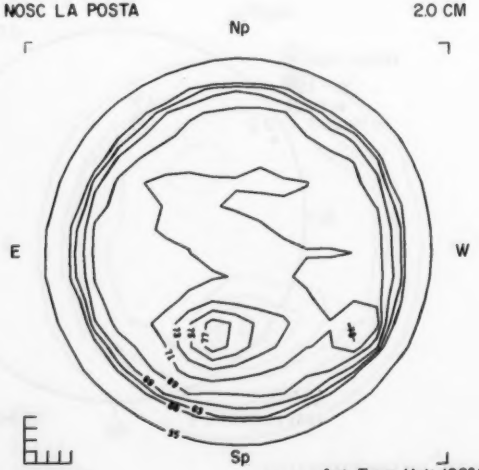
74-5802---

PROMINENCES

0735 UT

NOSC LA POSTA

2.0 CM

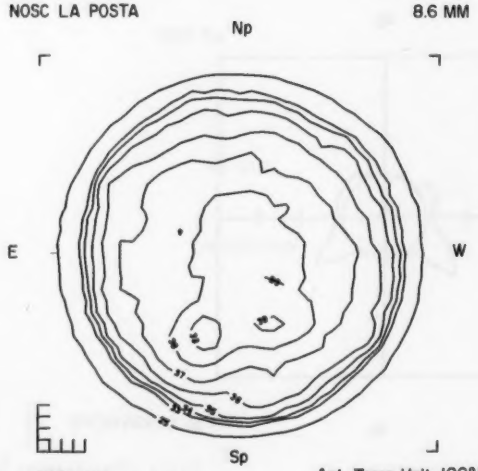



1944 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM




1829 UT

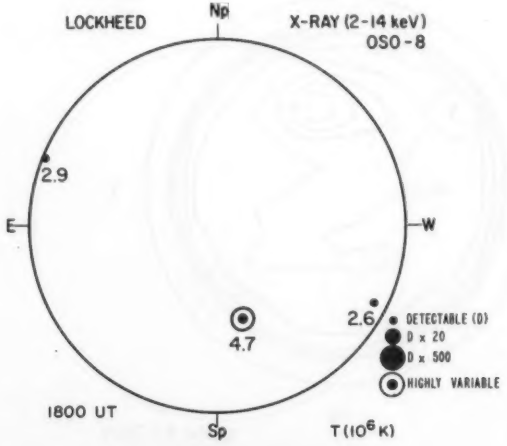
Ant. Temp. Unit 100°K

57

Jun 77

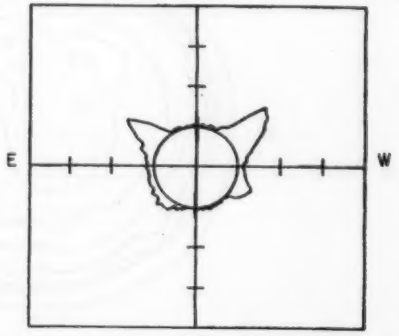
# JUNE 13, 1977 (P = -10.71, $B_o$ = 0.81, $L_o$ = 7.36)

LOCKHEED
X-RAY (2-14 keV)
OSO-8



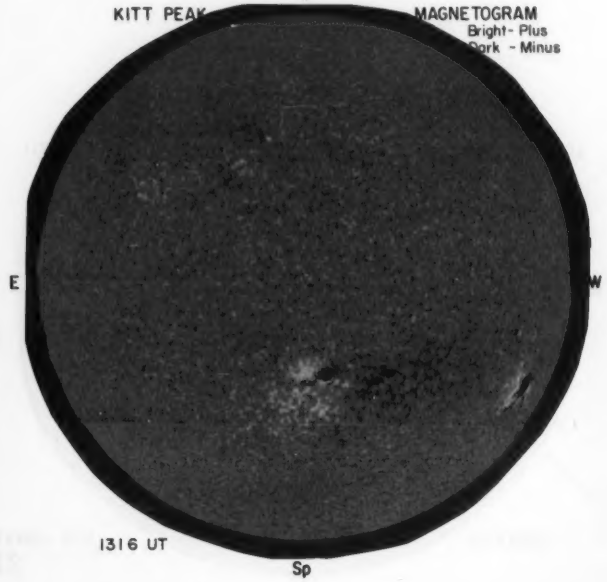

1800 UT
T($10^6$ K)

SACRAMENTO PEAK
CORONA (1.15 $R_\odot$)
5303 Å



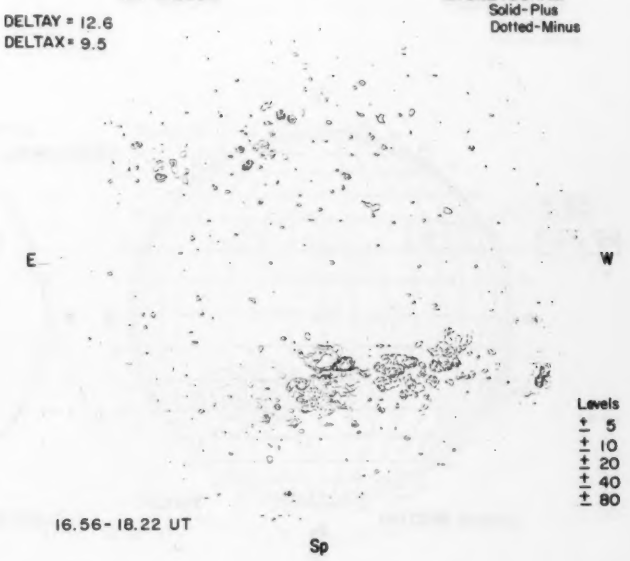

1520 UT

KITT PEAK
MAGNETOGRAM
Bright - Plus
Dark - Minus




1316 UT

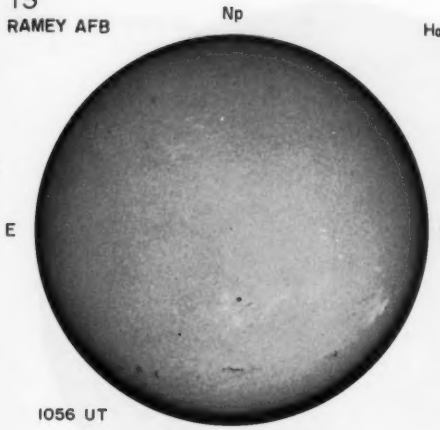
MT. WILSON
MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.5




16.56 - 18.22 UT

13

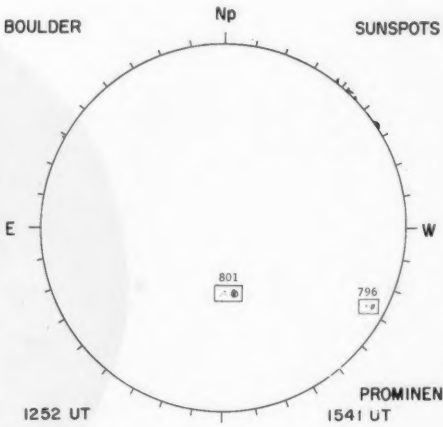
RAMEY AFB




1056 UT

Hα

BOULDER



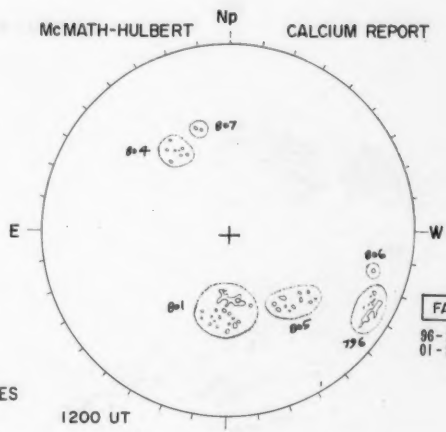

1252 UT

SUNSPOTS

PROMINENCES

1541 UT

McMATH-HULBERT




1200 UT

CALCIUM REPORT

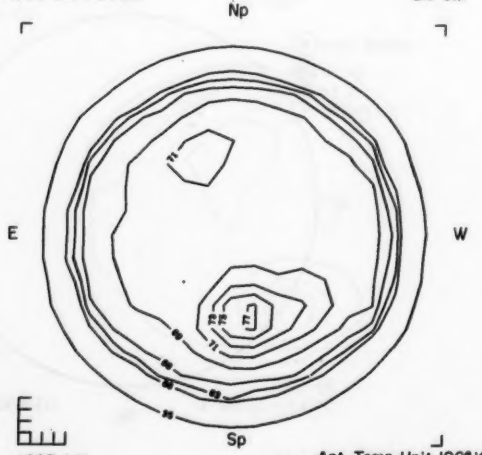
FAIR D

96-2100-3.0

01-2400-3.0

NOSC LA POSTA

2.0 CM




1607 UT

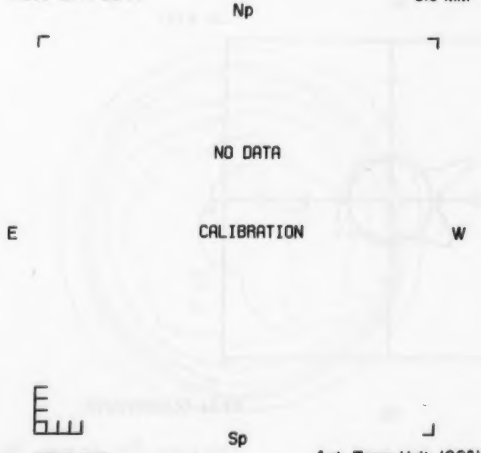
Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

NO DATA

CALIBRATION



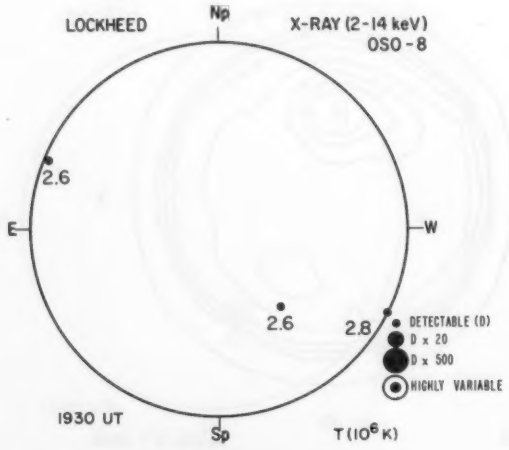

1728 UT

Ant. Temp. Unit 100°K

# JUNE 14, 1977 (P = -10.29, $B_o$ = 0.93, $L_o$ = 354.12)

LOCKHEED

X-RAY (2-14 keV)
OSO-8

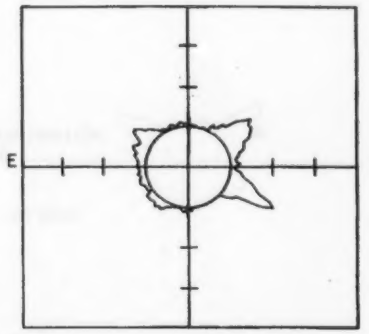



1930 UT

T($10^6$ K)

SACRAMENTO PEAK

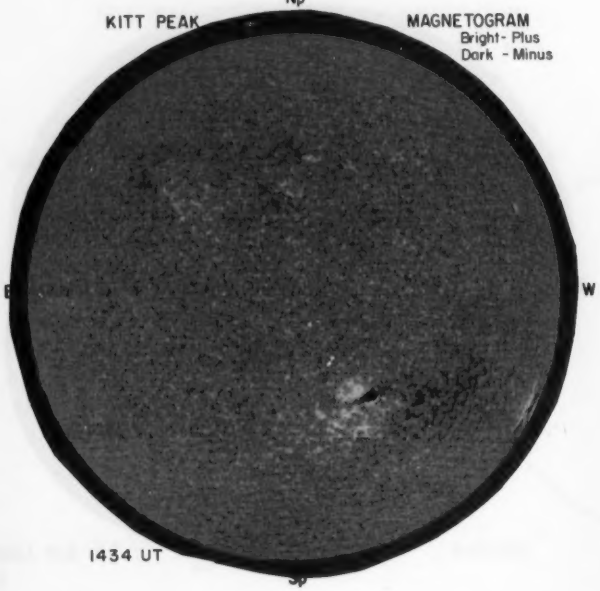
CORONA (1.15 $R_\odot$)
5303 Å




1513 UT

KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus

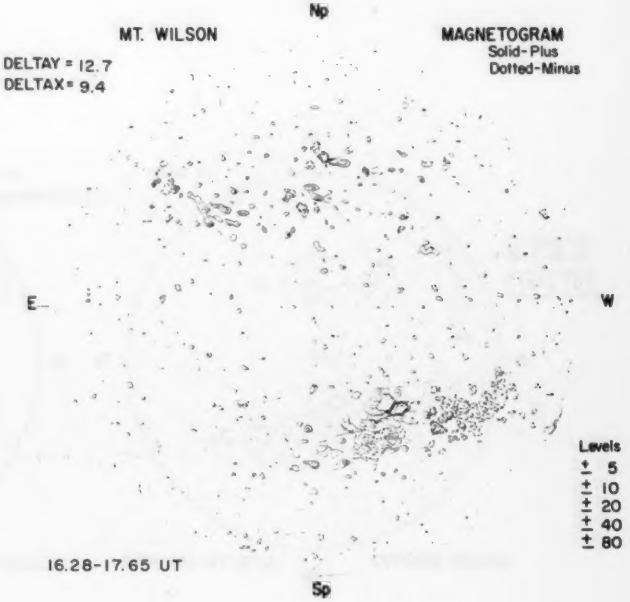



1434 UT

MT. WILSON

MAGNETOGRAM
Solid - Plus
Dotted - Minus

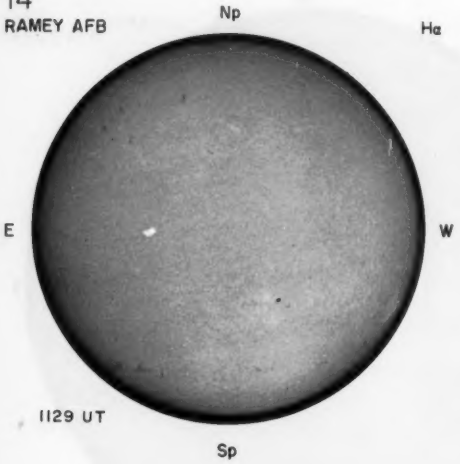
DELTAY = 12.7
DELTAX = 9.4




16.28-17.65 UT

14

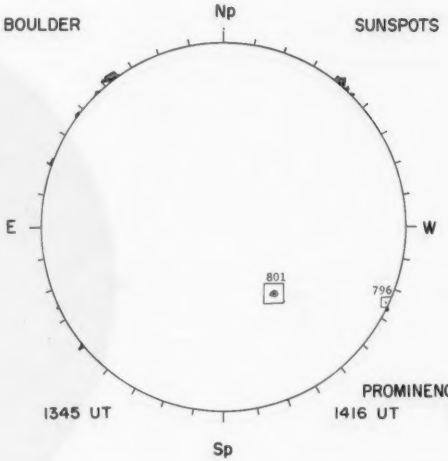
RAMEY AFB




1129 UT

Hα

BOULDER



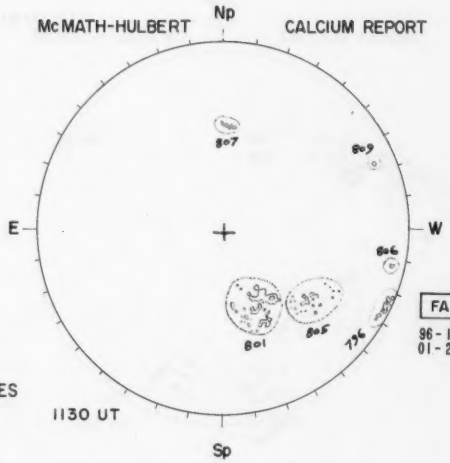

1345 UT

SUNSPOTS

PROMINENCES

1416 UT

McMATH-HULBERT




1130 UT

CALCIUM REPORT

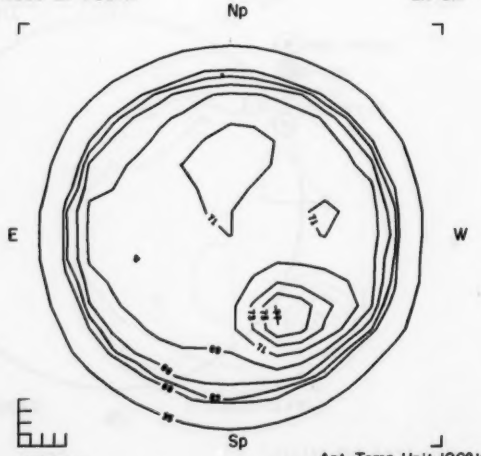
FAIR D

96 - 1600 - 3.0

01 - 2100 - 3.0

NOSC LA POSTA

2.0 CM

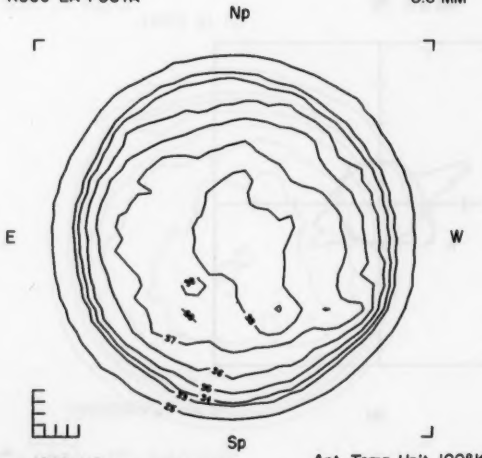



1650 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM




1809 UT

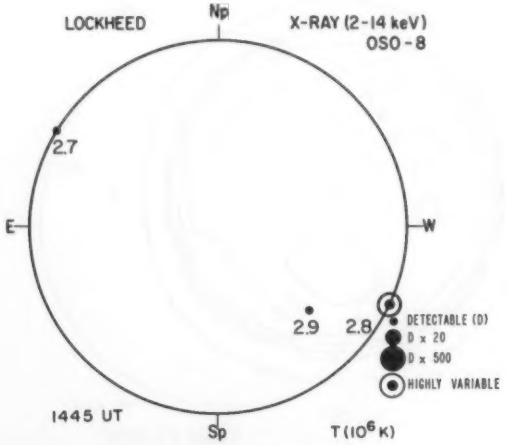
Ant. Temp. Unit 100°K

61

Jun 77

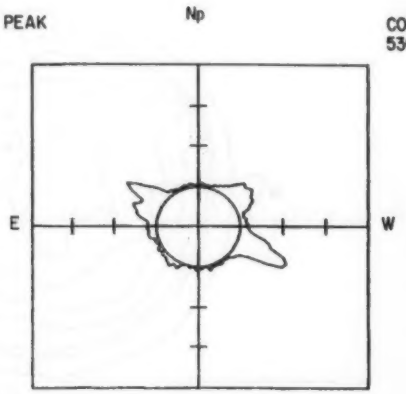
# JUNE 15, 1977 (P=-9.86, $B_0$=1.05, $L_0$=340.89)

LOCKHEED
X-RAY (2-14 keV)
OSO-8



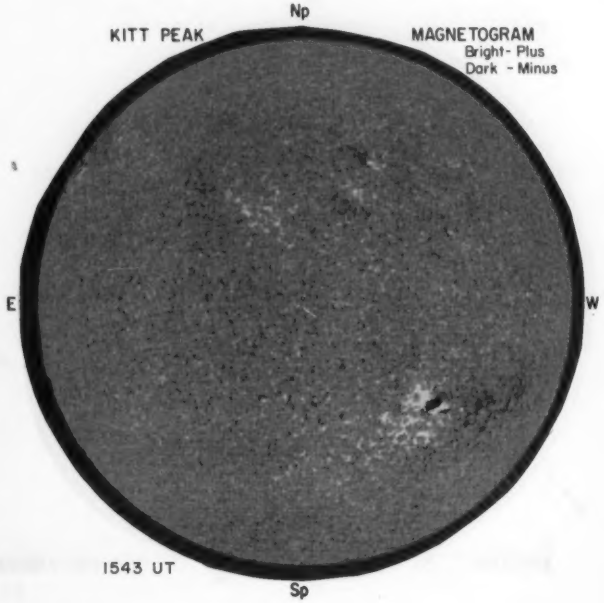

1445 UT
T($10^6$ K)

SACRAMENTO PEAK
CORONA (1.15 $R_\odot$)
5303 Å



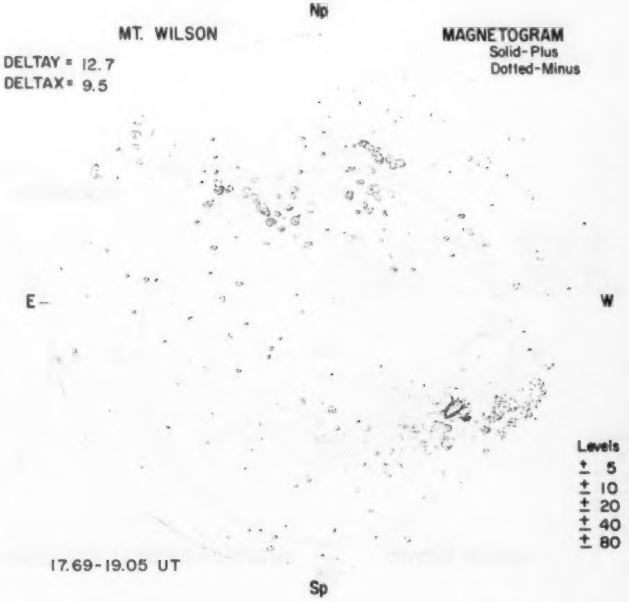

1502 UT

KITT PEAK
MAGNETOGRAM
Bright - Plus
Dark - Minus




1543 UT

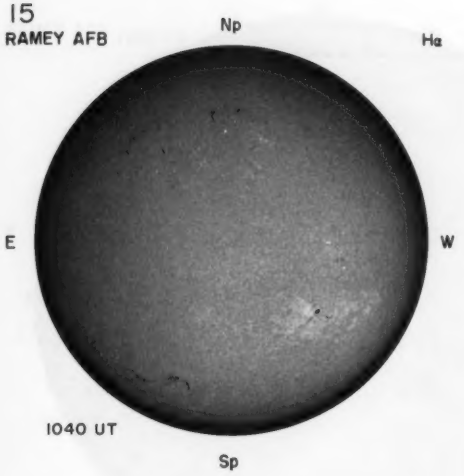
MT. WILSON
MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.7
DELTAX = 9.5




17.69-19.05 UT

15

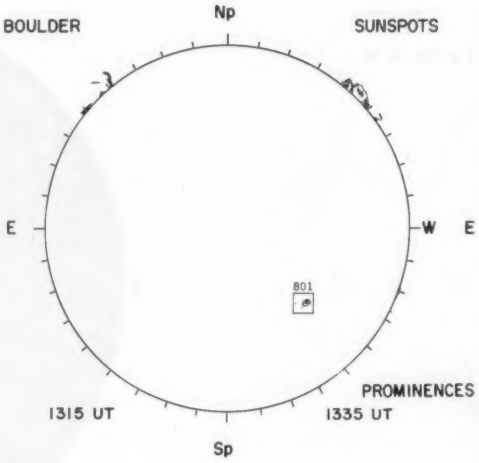
RAMEY AFB




1040 UT

Hα

BOULDER

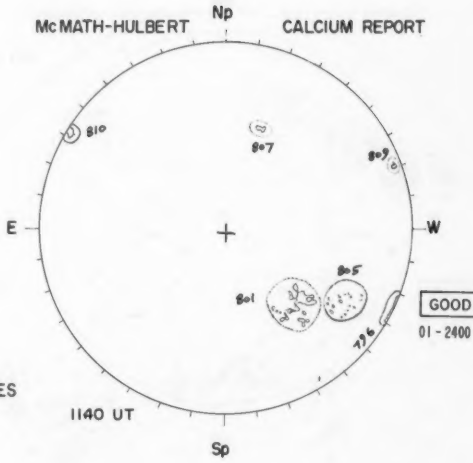



1315 UT

SUNSPOTS

1335 UT

McMATH-HULBERT




1140 UT

CALCIUM REPORT

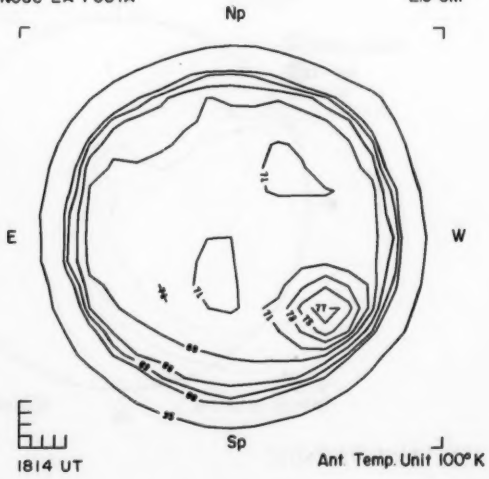
GOOD | S

01 - 2400 - 3.0

PROMINENCES

NOSC LA POSTA

2.0 CM

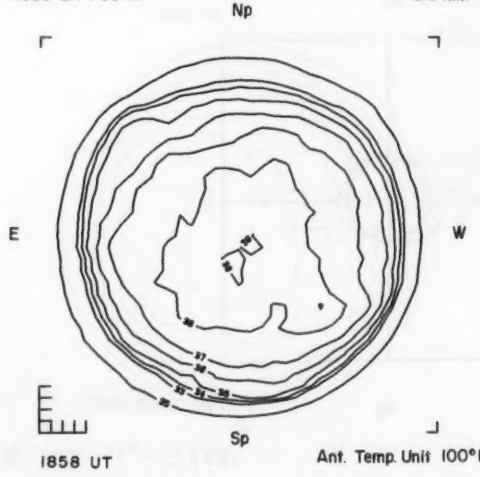



1814 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

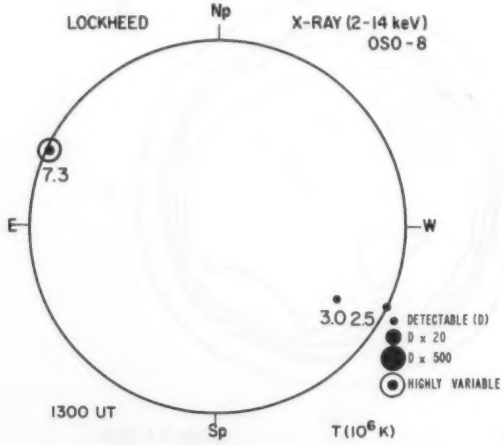
8.6 MM

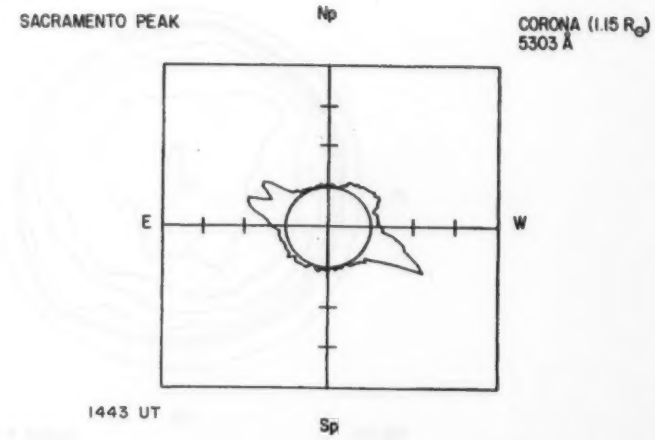


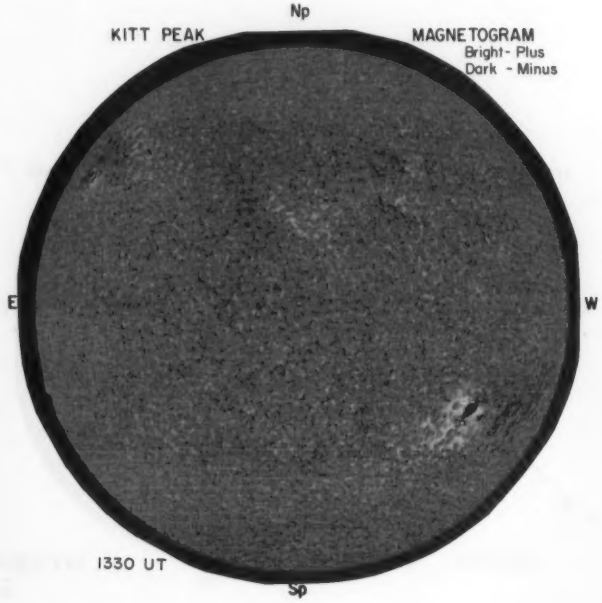

1858 UT

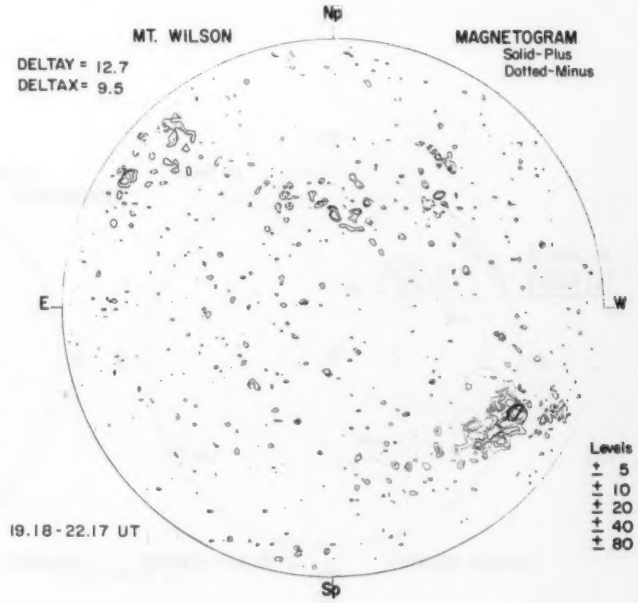
Ant. Temp. Unit 100°K

# JUNE 16, 1977 (P=-9.43, $B_o$=1.17, $L_o$=327.65)



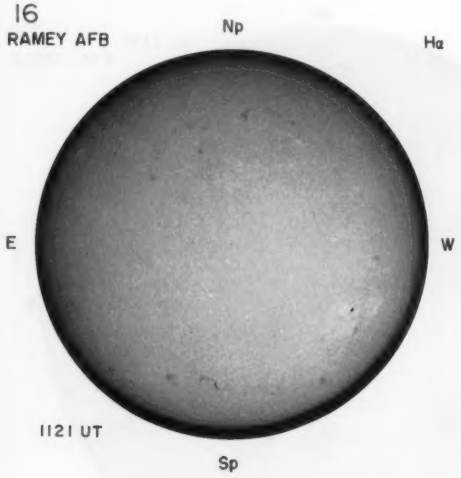



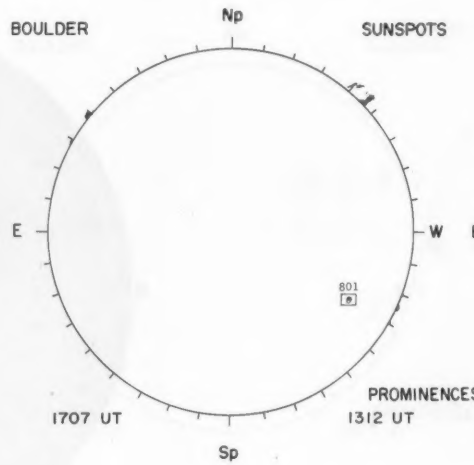
16

RAMEY AFB




1121 UT

Hα BOULDER




1707 UT

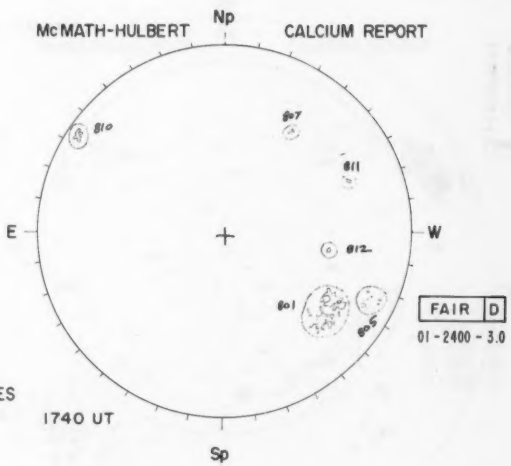
SUNSPOTS

PROMINENCES

1312 UT

McMATH-HULBERT

CALCIUM REPORT

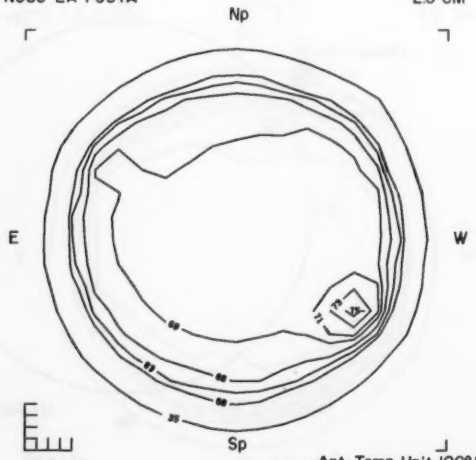



1740 UT

FAIR D

01 - 2400 - 3.0

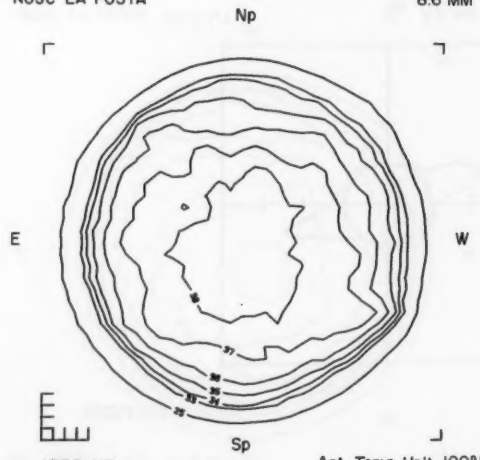
NOSC LA POSTA 2.0 CM




1618 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

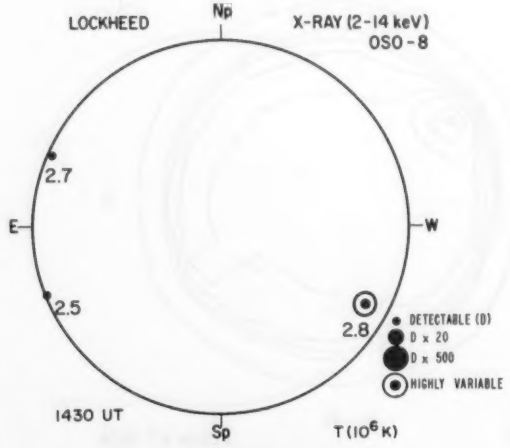



1732 UT

Ant. Temp. Unit 100°K

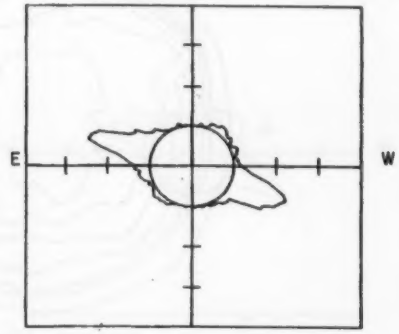
# JUNE 17, 1977 (P = -9.00, $B_o$ = 1.29, $L_o$ = 314.41)

LOCKHEED X-RAY (2-14 keV) OSO-8




1430 UT T($10^6$ K)

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



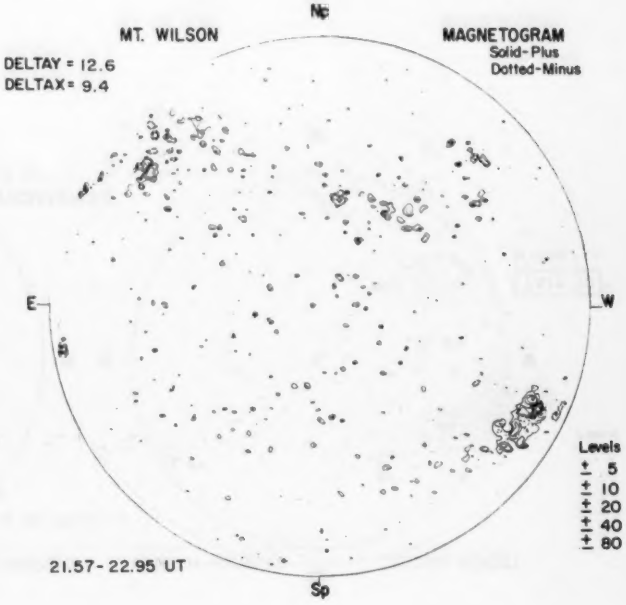

1414 UT

KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus

1417 UT

MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

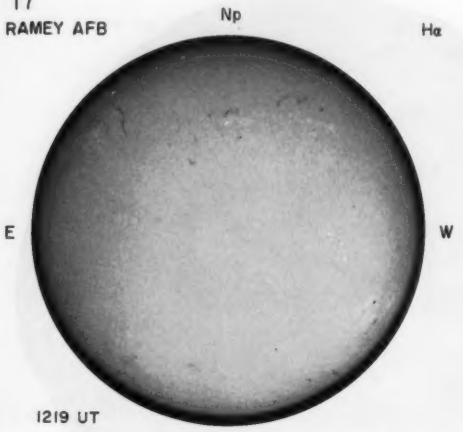
DELTAY = 12.6
DELTAX = 9.4




21.57 - 22.95 UT

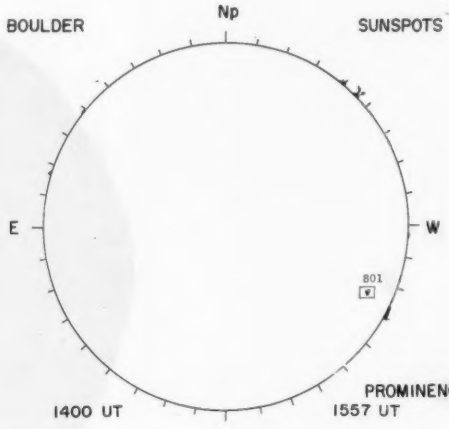
17

RAMEY AFB




1219 UT

Hα BOULDER



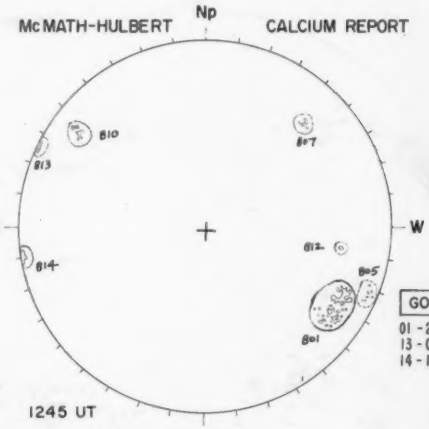

1400 UT

SUNSPOTS

PROMINENCES

1557 UT

McMATH-HULBERT



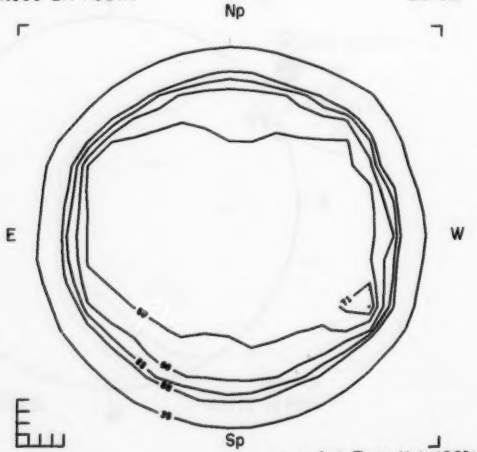

1245 UT

CALCIUM REPORT

| GOOD | S |
|---|---|

01 - 2300 - 3.0
13 - 0900 - 2.5
14 - 1000 - 2.5

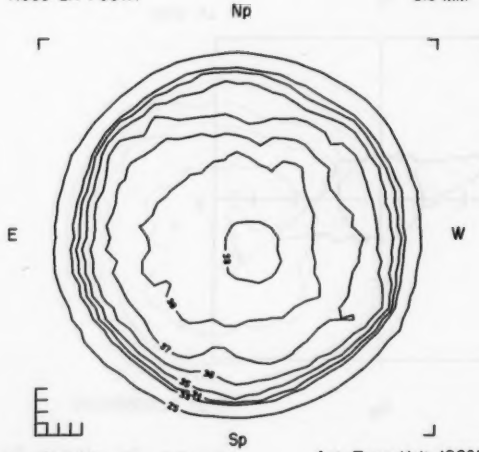
NOSC LA POSTA 2.0 CM




1715 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



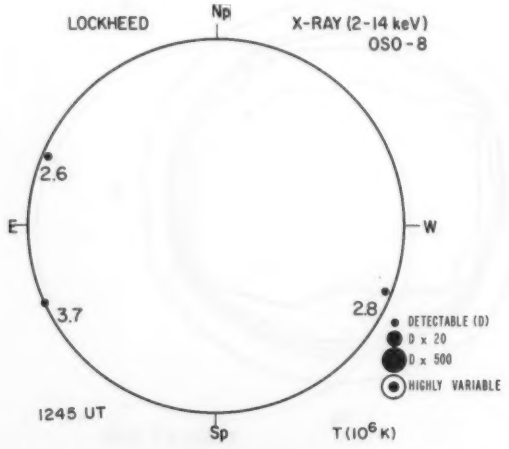

1816 UT

Ant. Temp. Unit 100°K

67
Jun 77

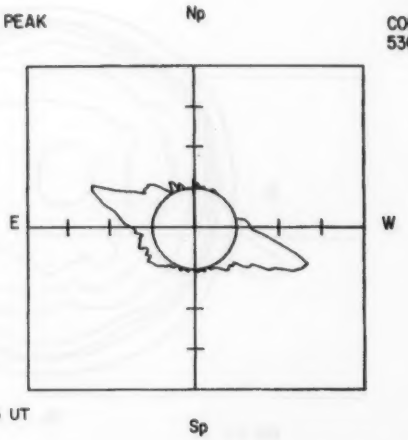
# JUNE 18, 1977 (P = -8.56, $B_o$ = 1.40, $L_o$ = 301.18)

LOCKHEED
X-RAY (2-14 keV)
OSO-8



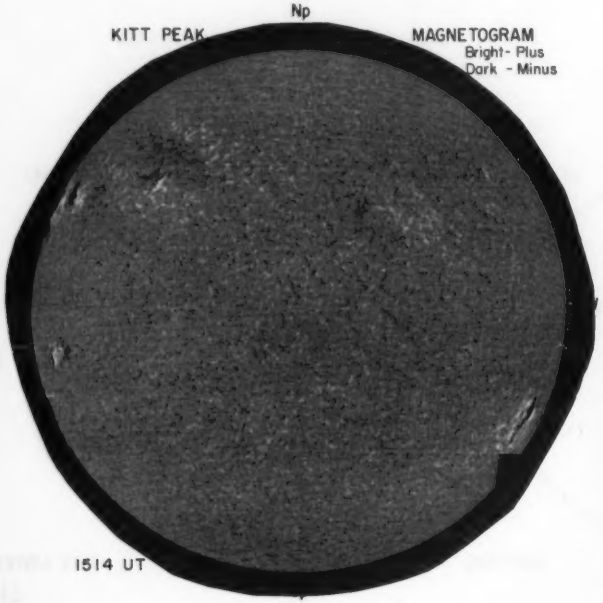

1245 UT
T($10^6$ K)

SACRAMENTO PEAK
CORONA (1.15 $R_\odot$)
5303 Å



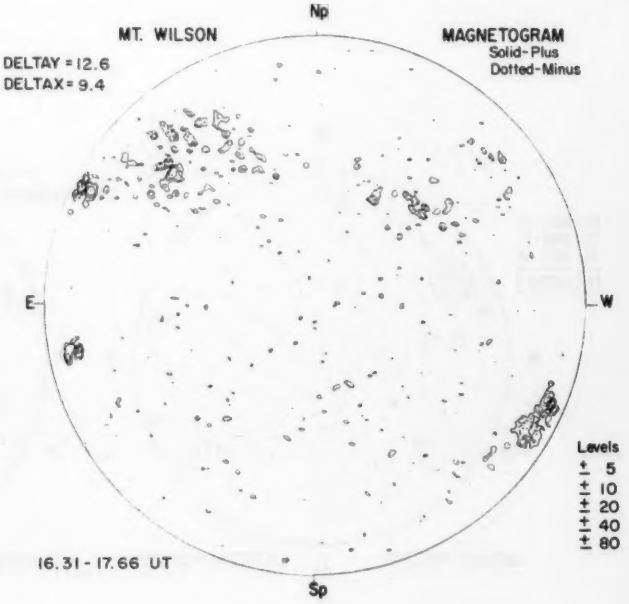

1505 UT

KITT PEAK
MAGNETOGRAM
Bright - Plus
Dark - Minus




1514 UT

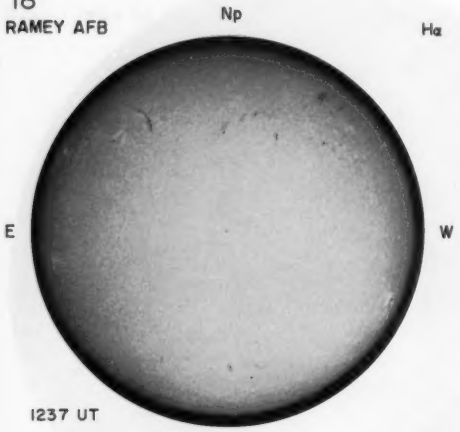
MT. WILSON
MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.4




16.31 - 17.66 UT

18

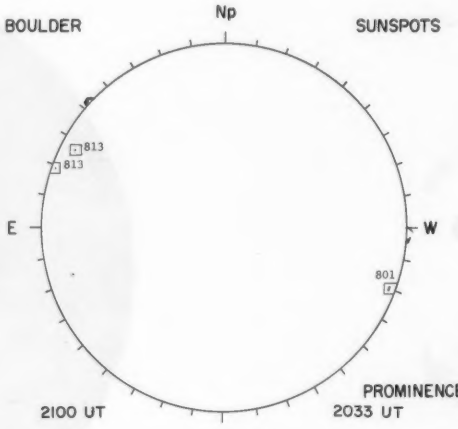
RAMEY AFB




1237 UT

Hα

BOULDER




2100 UT

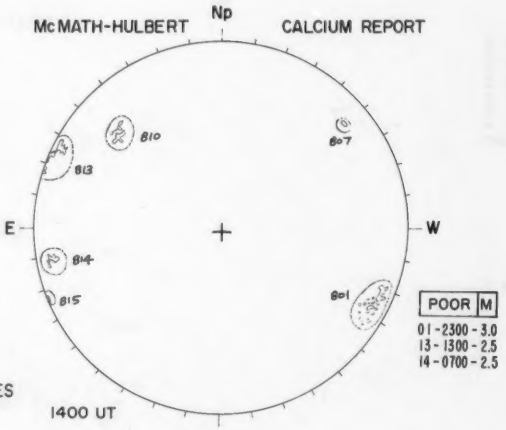
SUNSPOTS

PROMINENCES

2033 UT

McMATH-HULBERT

CALCIUM REPORT

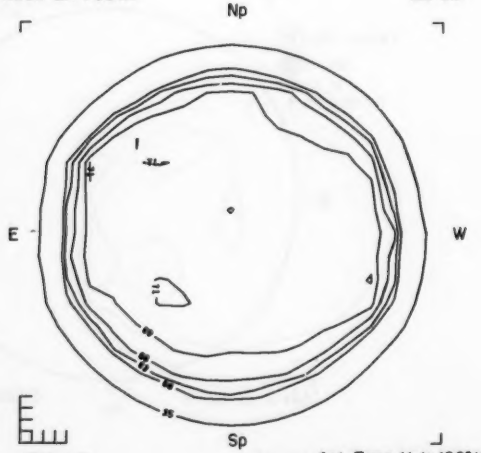



1400 UT

| POOR | M |
|---|---|
| 01 - 2300 - 3.0 | |
| 13 - 1300 - 2.5 | |
| 14 - 0700 - 2.5 | |

NOSC LA POSTA

2.0 CM

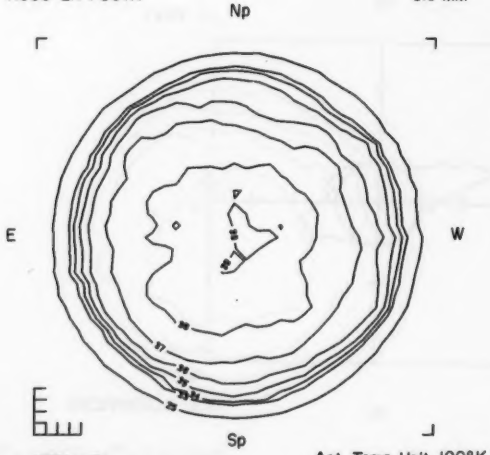



1712 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

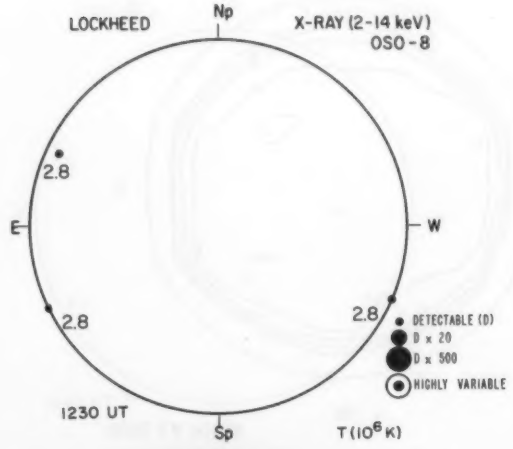



1751 UT

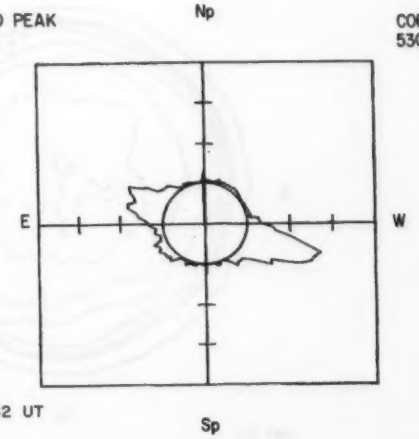
Ant. Temp. Unit 100°K

# JUNE 19, 1977 (P = -8.13, $B_o$ = 1.52, $L_o$ = 287.94)

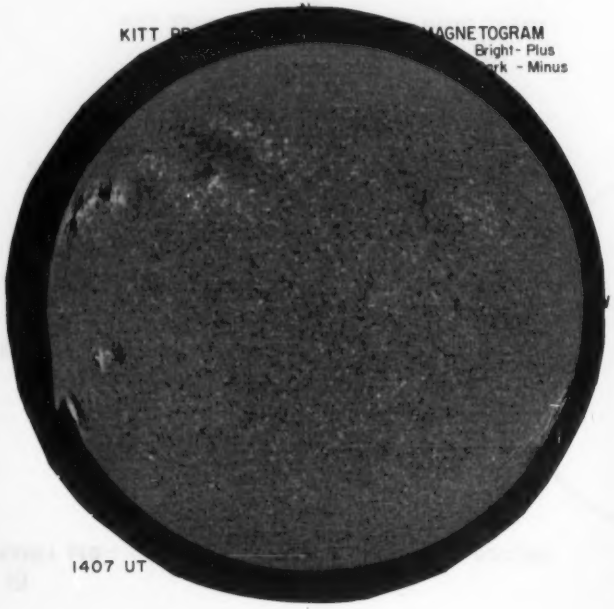
LOCKHEED X-RAY (2-14 keV) OSO-8



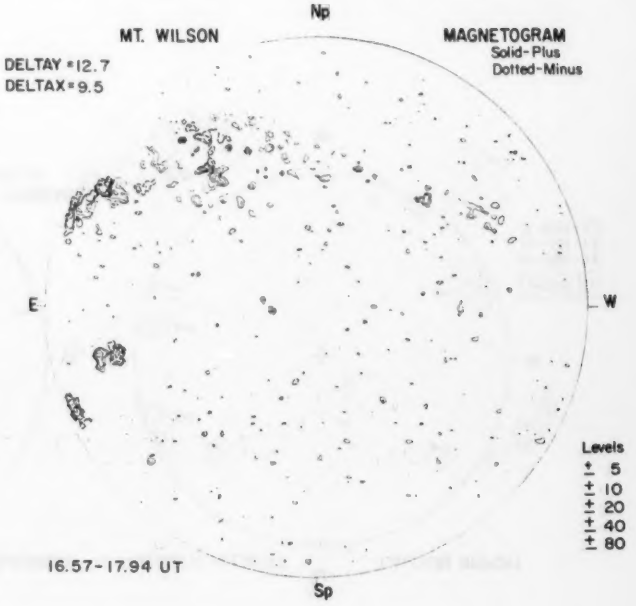

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å




KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus

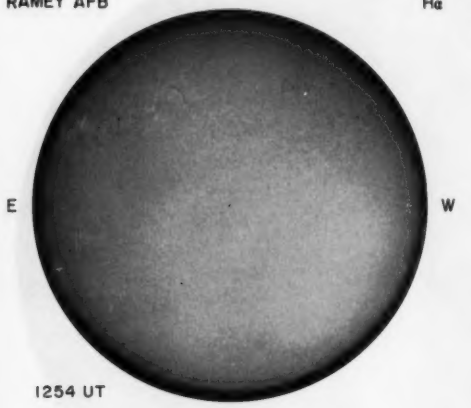



MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.7
DELTAX = 9.5



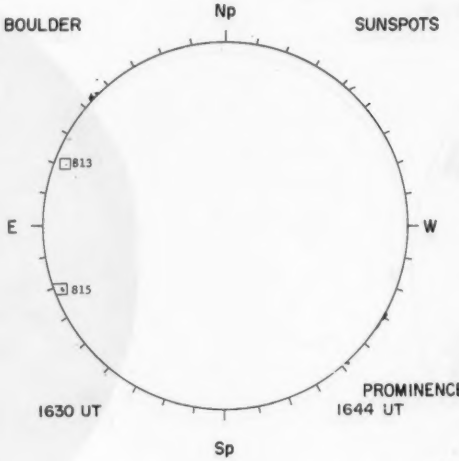
19

RAMEY AFB




1254 UT

BOULDER

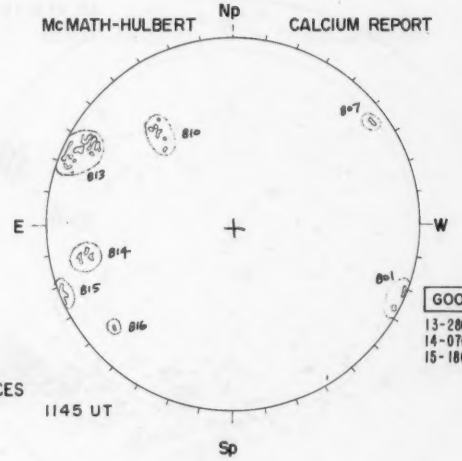



1630 UT

PROMINENCES

1644 UT

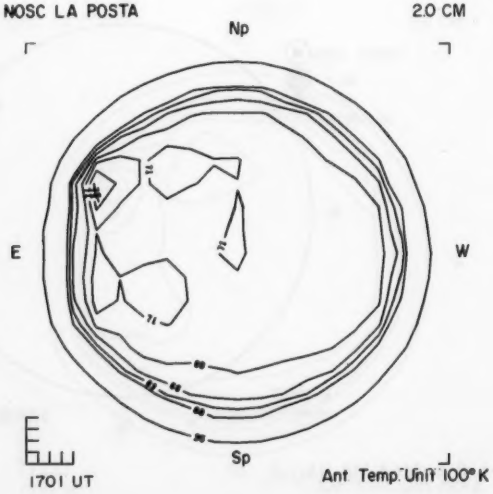
McMATH-HULBERT




1145 UT

GOOD | S
13-2800-3.0
14-0700-2.5
15-1800-3.5

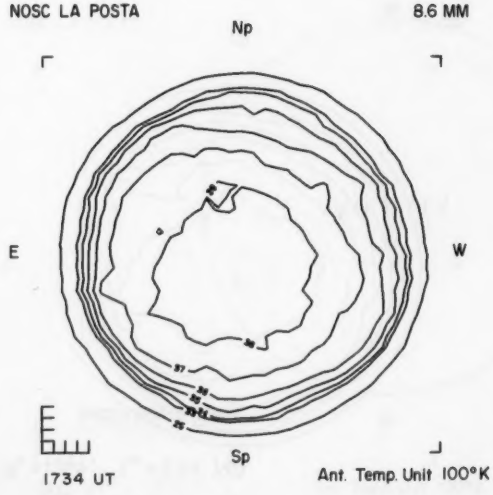
NOSC LA POSTA




1701 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA




1734 UT

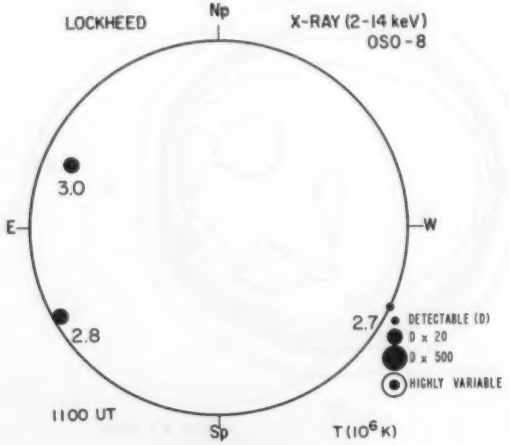
Ant. Temp. Unit 100°K

71
Jun 77

JUNE 20, 1977 (P = -7.69, $B_o$ = 1.64, $L_o$ = 274.70)

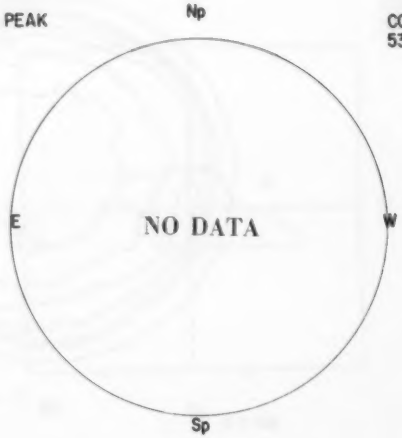
LOCKHEED

X-RAY (2-14 keV)
OSO-8



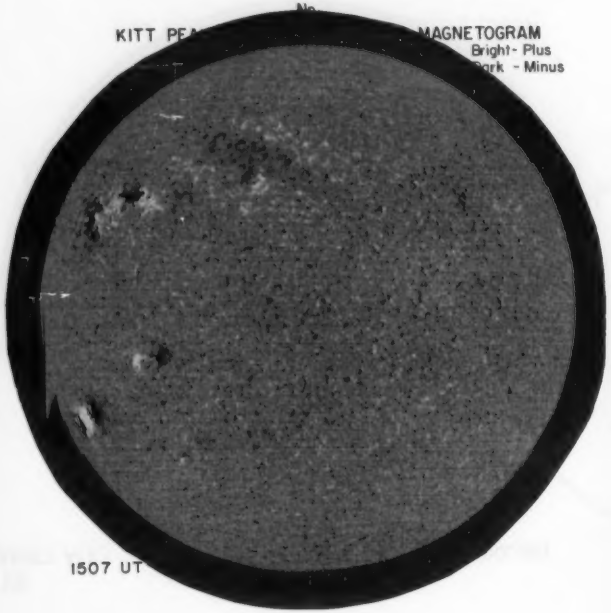

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



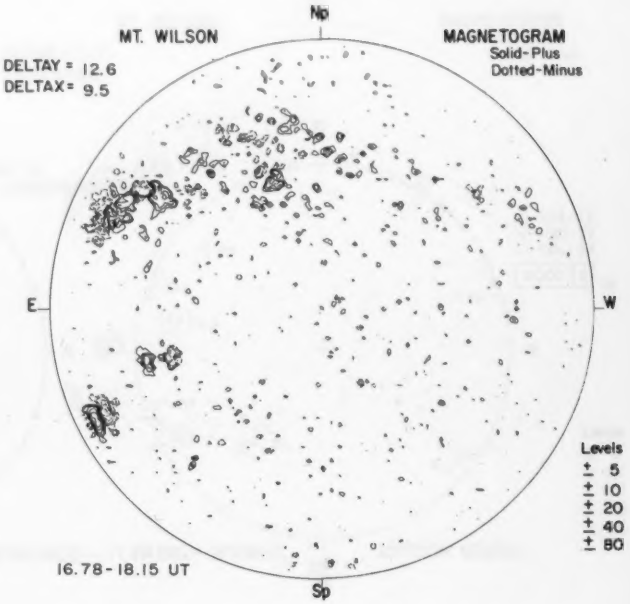

KITT PEAK

MAGNETOGRAM
Bright - Plus
Dark - Minus



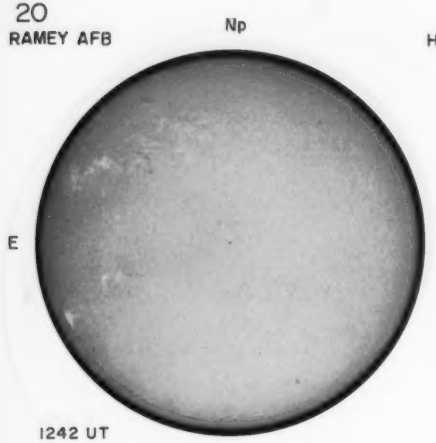

MT. WILSON

MAGNETOGRAM
Solid-Plus
Dotted-Minus



20

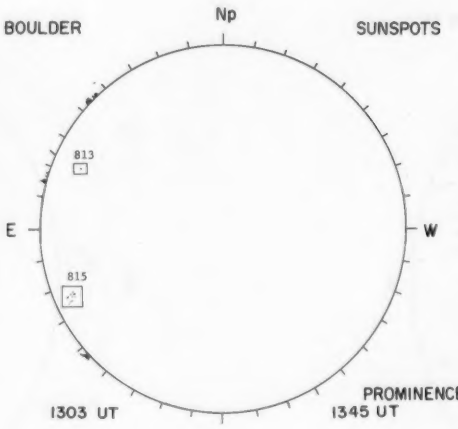
RAMEY AFB




1242 UT

Hα

BOULDER



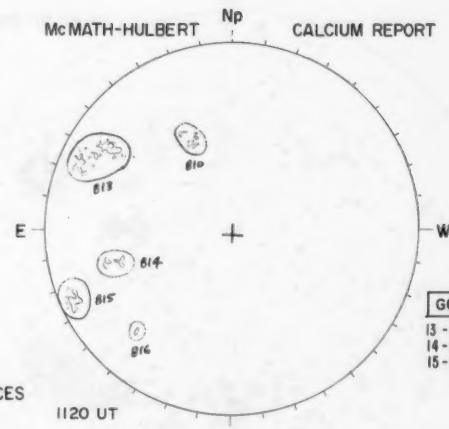

1303 UT

SUNSPOTS

PROMINENCES

1345 UT

McMATH-HULBERT



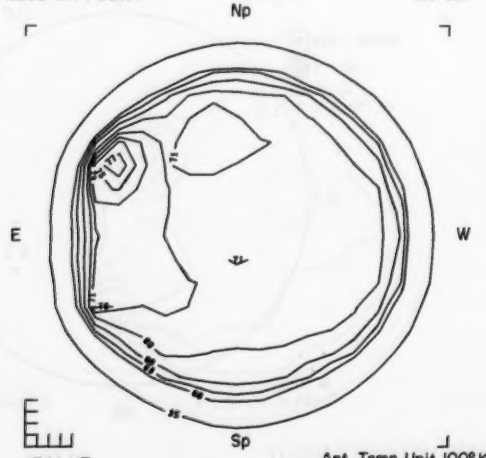

1120 UT

CALCIUM REPORT

| GOOD | D |
|---|---|
| 13 - 2800 - 3.0 | |
| 14 - 0600 - 2.5 | |
| 15 - 2100 - 3.5 | |

NOSC LA POSTA

2.0 CM

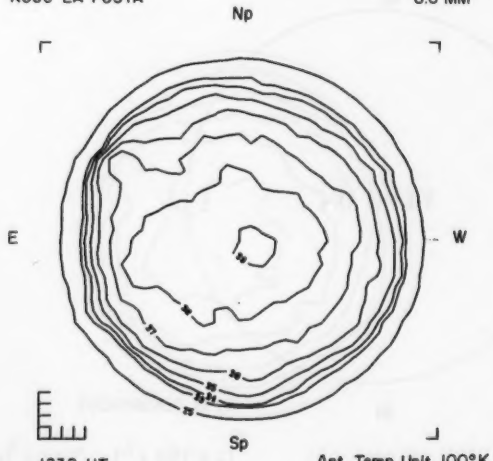



1741 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

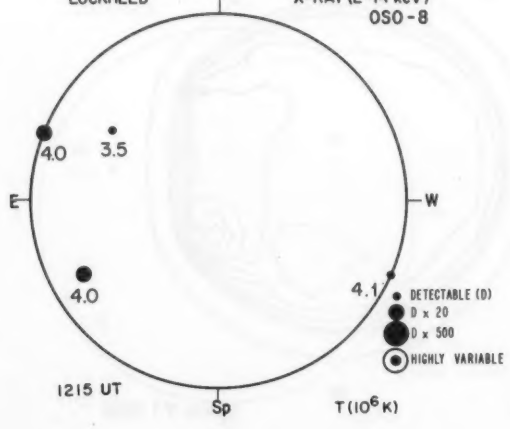



1832 UT

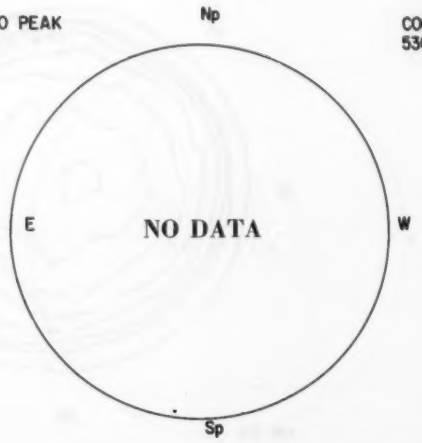
Ant. Temp. Unit 100°K

# JUNE 21, 1977 (P = -7.25, $B_0$ = 1.76, $L_0$ = 261.47)

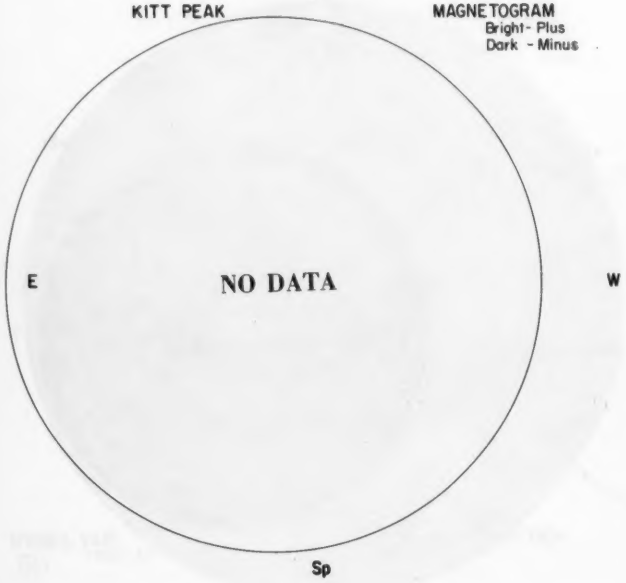
LOCKHEED
X-RAY (2-14 keV)
OSO-8



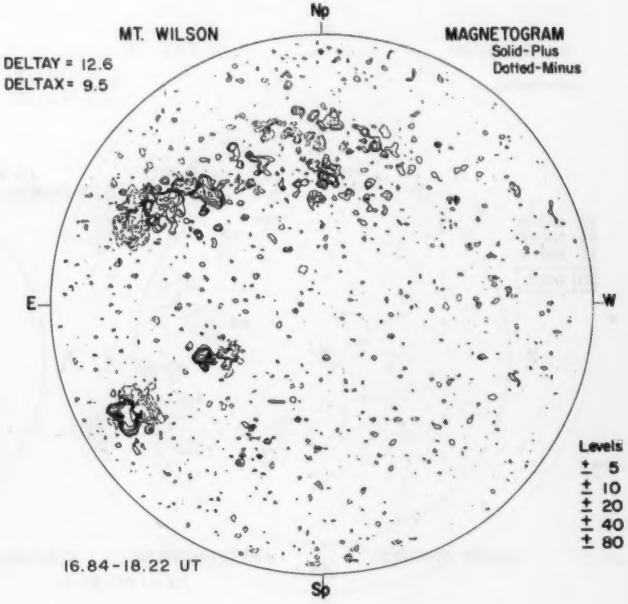

SACRAMENTO PEAK
CORONA (1.15 $R_\odot$)
5303 Å




KITT PEAK
MAGNETOGRAM
Bright - Plus
Dark - Minus

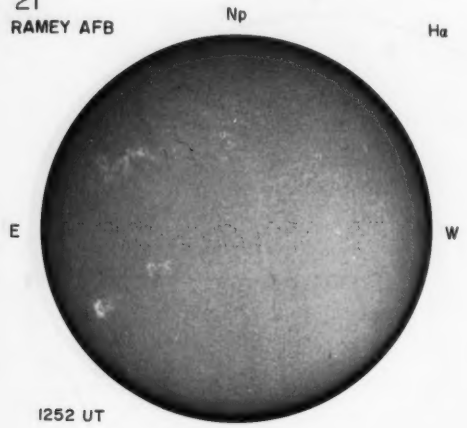



MT. WILSON
MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.5



21

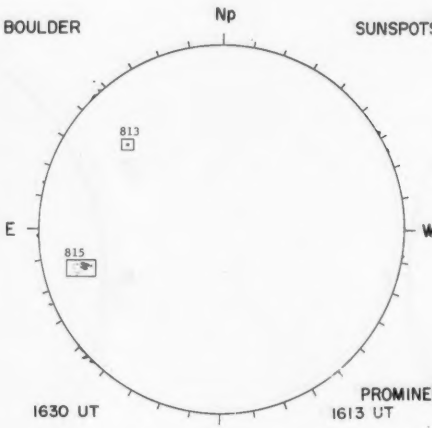
RAMEY AFB




1252 UT

Hα

BOULDER



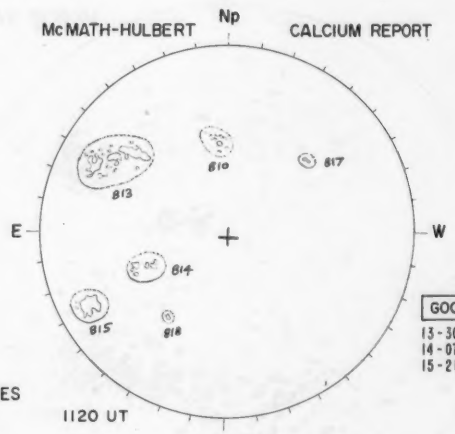

1630 UT

SUNSPOTS

PROMINENCES

1613 UT

McMATH-HULBERT




1120 UT

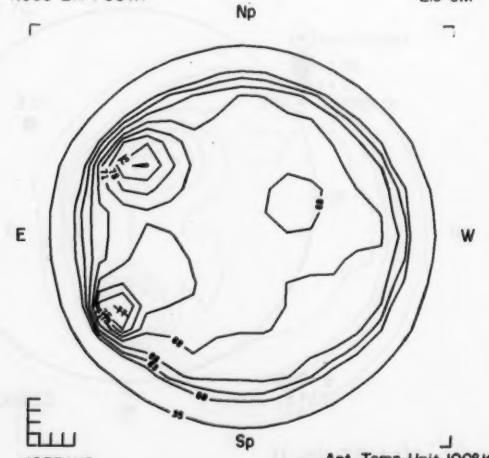
CALCIUM REPORT

| GOOD | D |
|---|---|

13 - 3000 - 3.0
14 - 0700 - 3.0
15 - 2100 - 3.5

NOSC LA POSTA

2.0 CM

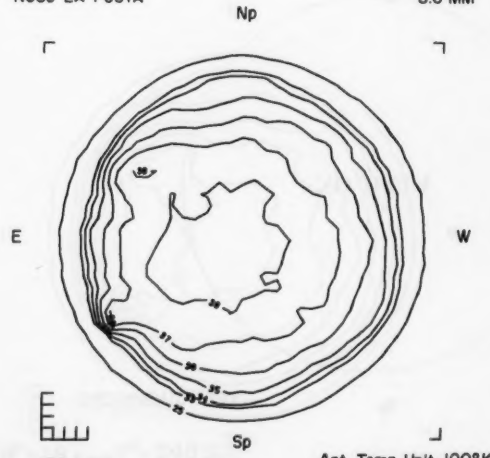



1653 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



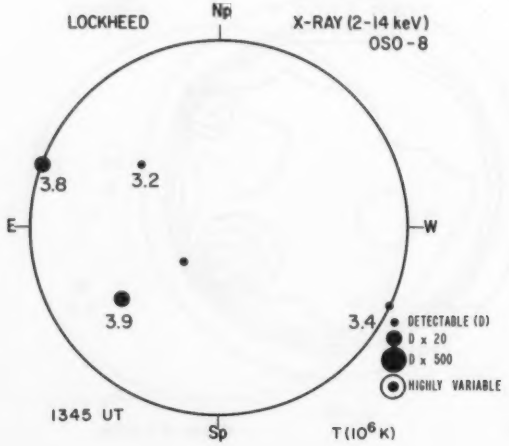

1754 UT

Ant. Temp. Unit 100°K

75
Jun 77

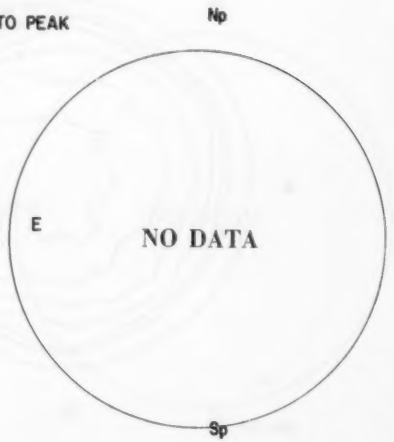
JUNE 22, 1977 (P = -6.80, $B_o$ = 1.87 $L_o$ = 248.23)

LOCKHEED X-RAY (2-14 keV) OSO-8

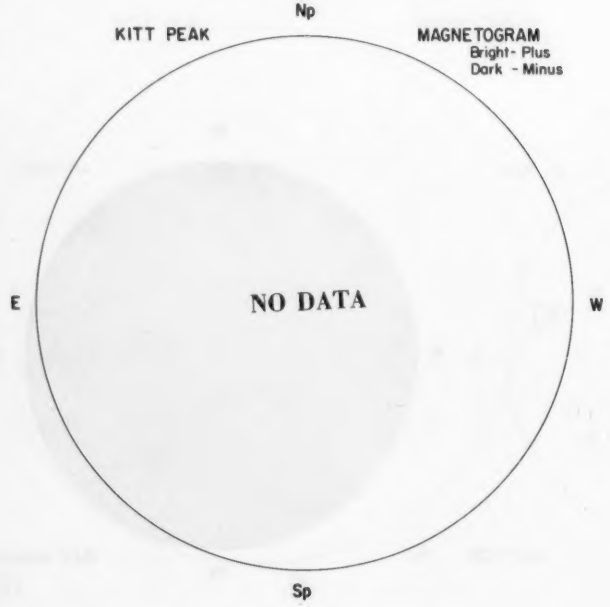



1345 UT T($10^6$ K)

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

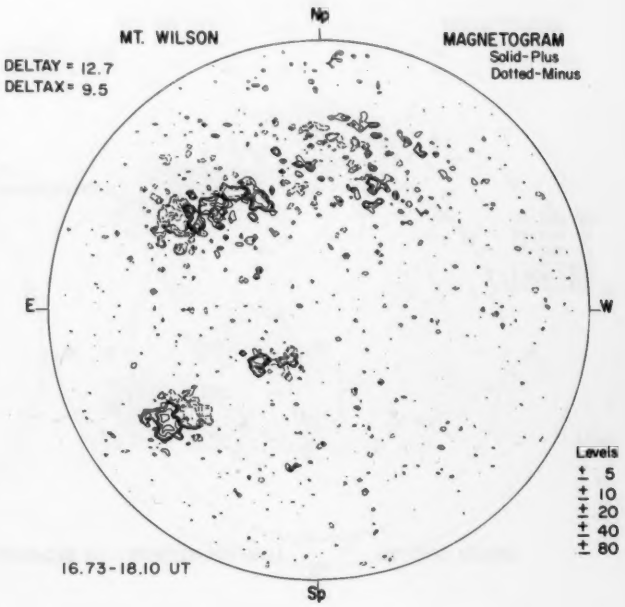



KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus



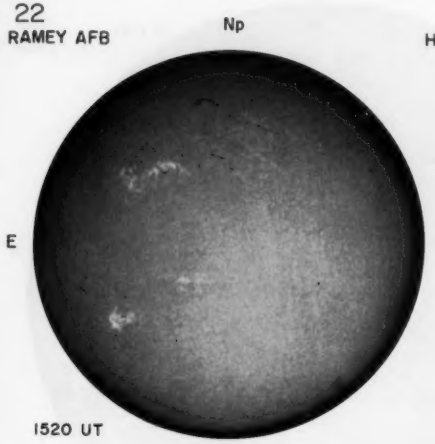

MT. WILSON MAGNETOGRAM Solid-Plus Dotted-Minus

DELTAY = 12.7
DELTAX = 9.5



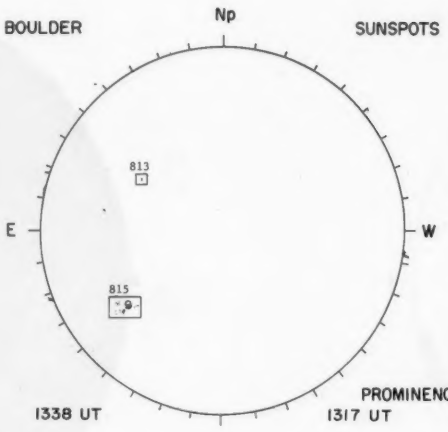

16.73-18.10 UT

RAMEY AFB




1520 UT

Hα BOULDER

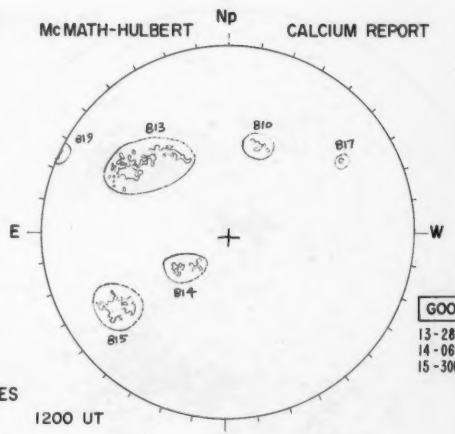



1338 UT

SUNSPOTS

1317 UT

McMATH-HULBERT



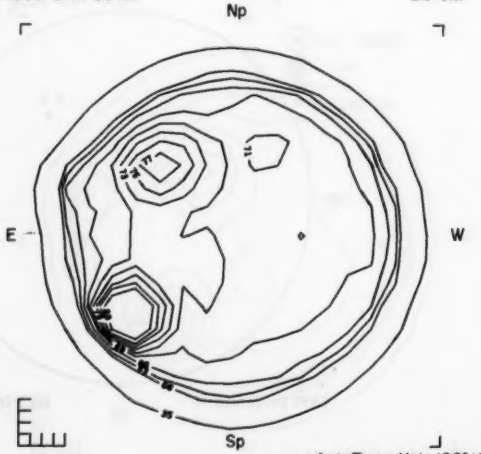

1200 UT

CALCIUM REPORT

| GOOD | S |
|---|---|
| 13 - 2800 - 3.0 | |
| 14 - 0600 - 2.5 | |
| 15 - 3000 - 3.5 | |

PROMINENCES

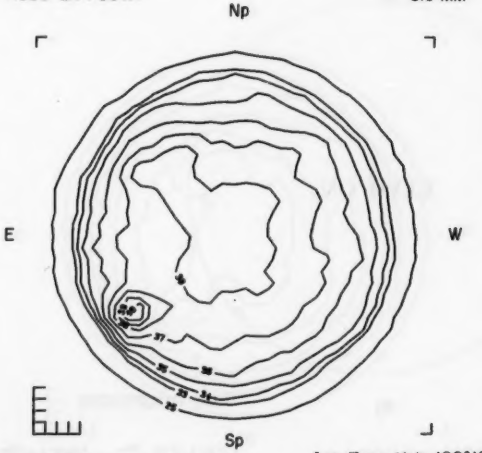
NOSC LA POSTA 2.0 CM




1708 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

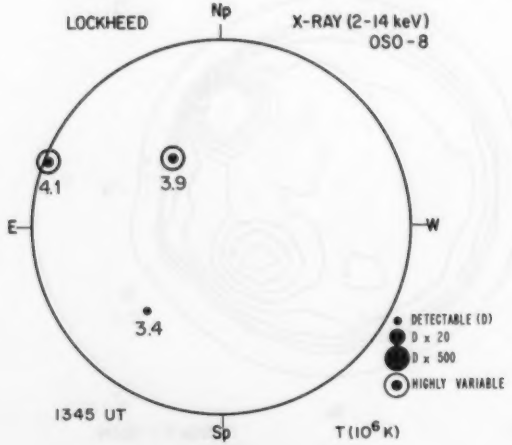



1750 UT

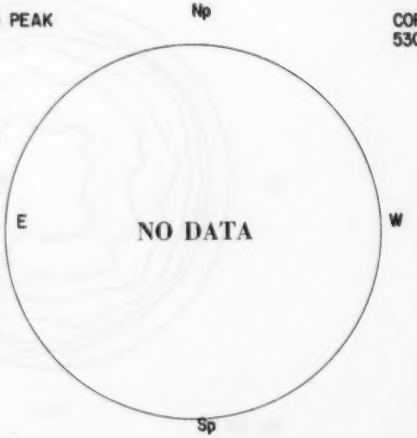
Ant. Temp. Unit 100°K

JUNE 23, 1977 (P = -6.36, $B_o$ = 1.99, $L_o$ = 234.99)

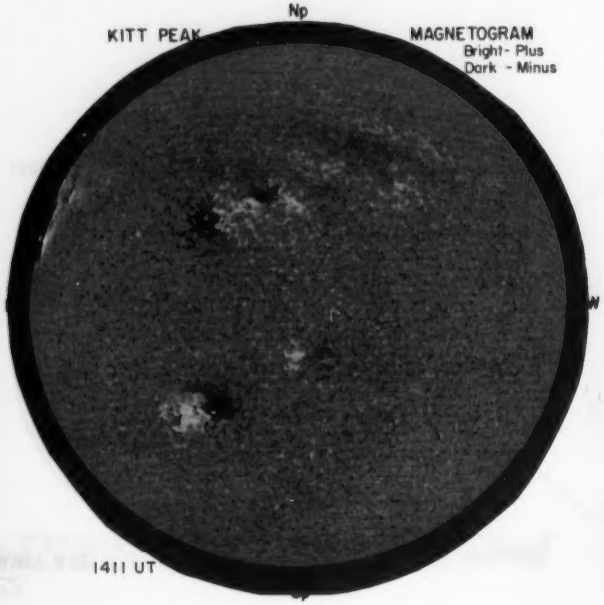
LOCKHEED X-RAY (2-14 keV) OSO-8




SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

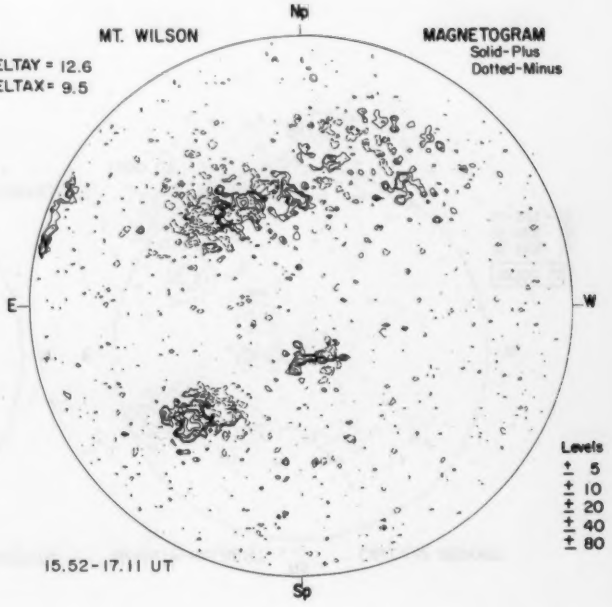



KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus




MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

DELTAY = 12.6
DELTAX = 9.5



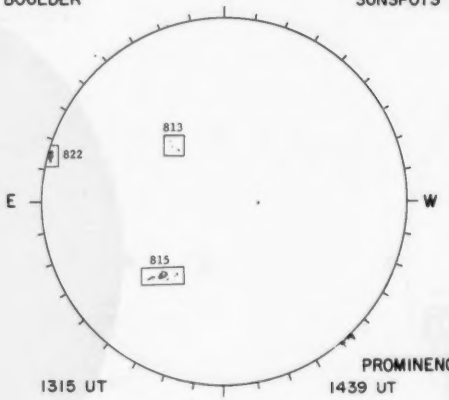
23

RAMEY AFB

Hα

1410 UT

BOULDER

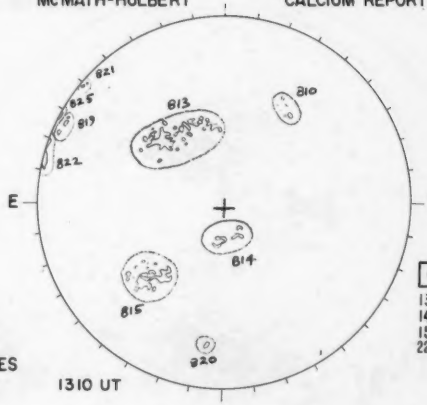



1315 UT

SUNSPOTS

1439 UT

McMATH-HULBERT




1310 UT

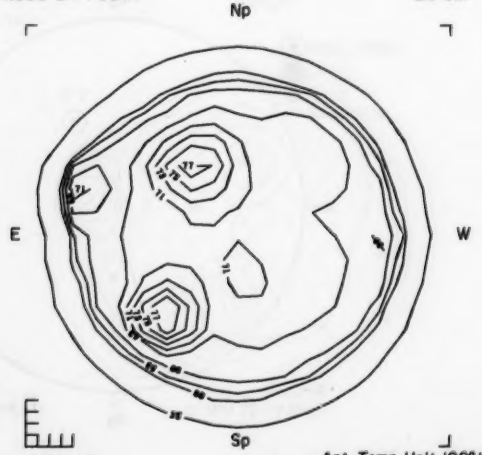
CALCIUM REPORT

| GOOD | S |
|---|---|
| 13 - 2800 - 3.5 | |
| 14 - 0600 - 2.5 | |
| 15 - 2700 - 3.5 | |
| 22 - 2000 - 3.5 | |

PROMINENCES

NOSC LA POSTA

2.0 CM

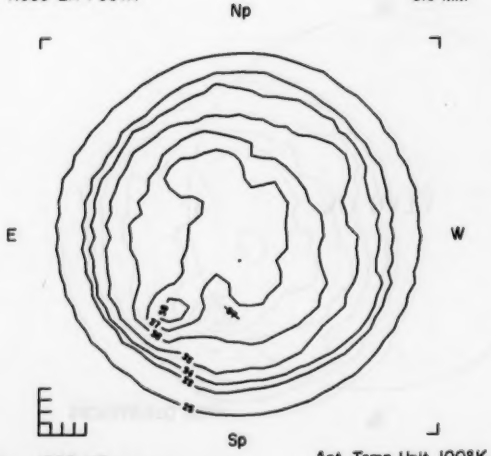



1545 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



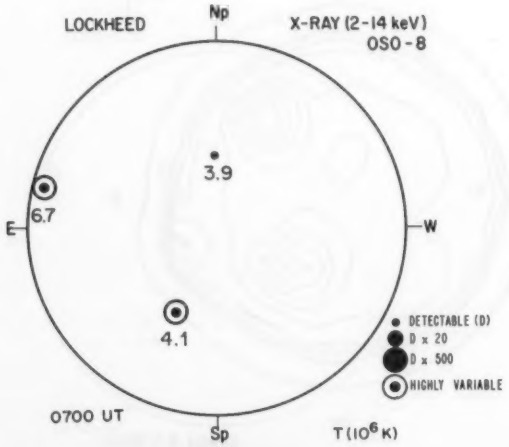

1628 UT

Ant. Temp. Unit 100°K

79 Jun 77

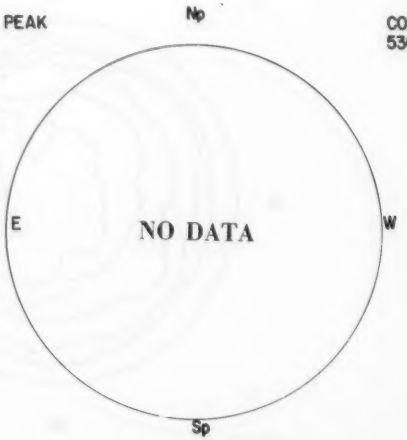
JUNE 24, 1977 (P=-5.91, $B_0$=2.11, $L_0$=221.76)

LOCKHEED X-RAY (2-14 keV) OSO-8

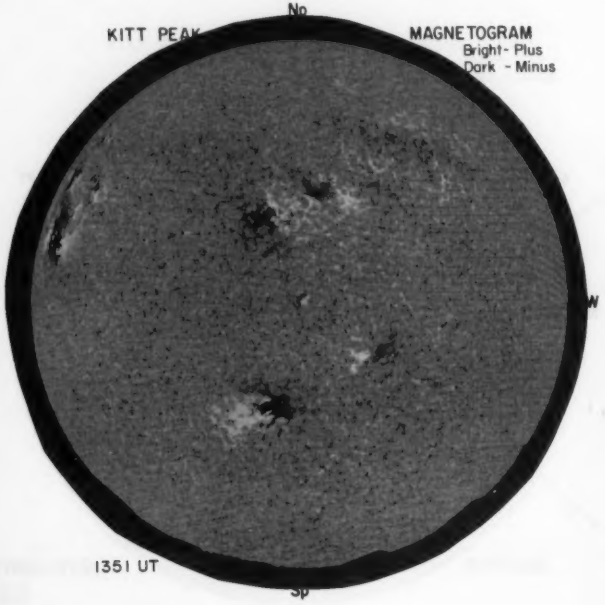



0700 UT T($10^6$K)

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å



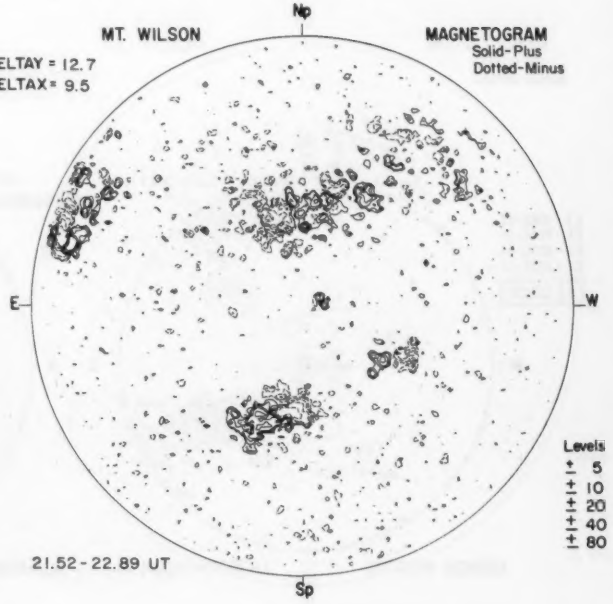

KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus




1351 UT

MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

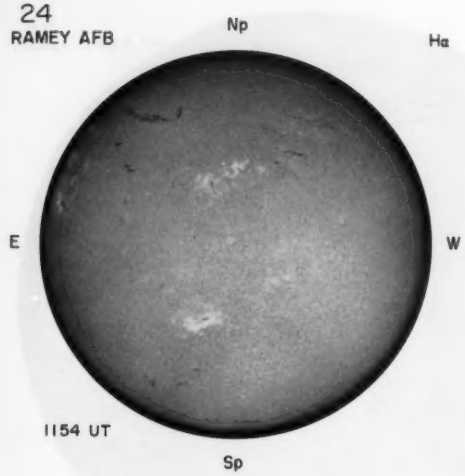
DELTAY = 12.7
DELTAX = 9.5




21.52-22.89 UT

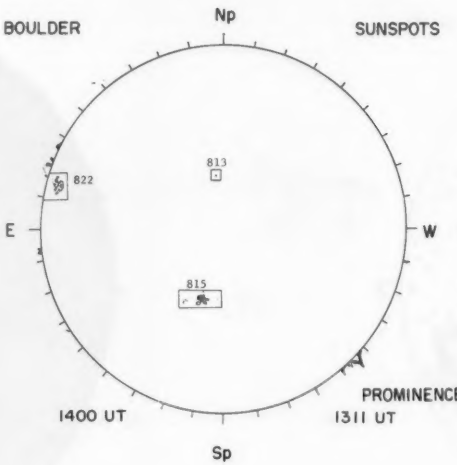
24

RAMEY AFB




1154 UT

Hα BOULDER




1400 UT

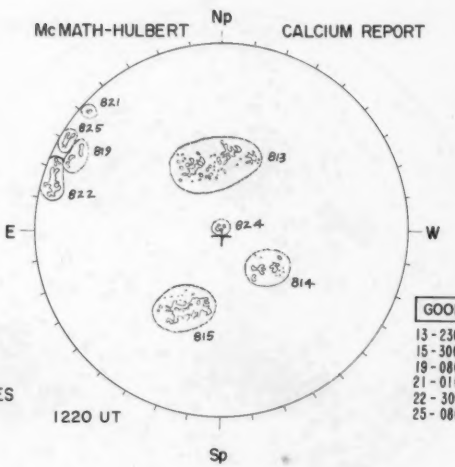
SUNSPOTS

PROMINENCES

1311 UT

McMATH-HULBERT

CALCIUM REPORT

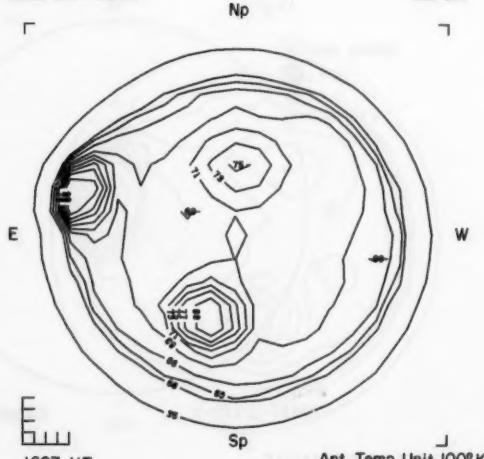



1220 UT

| GOOD | M |
|---|---|
| 13 - 2300 | 3.0 |
| 15 - 3000 | 4.0 |
| 19 - 0800 | 3.0 |
| 21 - 0100 | 3.0 |
| 22 - 3000 | 4.0 |
| 25 - 0800 | 3.0 |

NOSC LA POSTA

2.0 CM

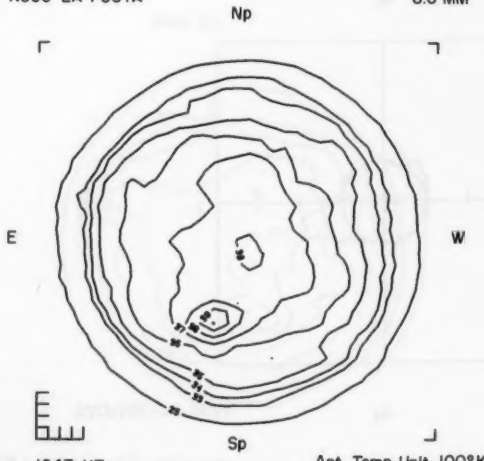



1607 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



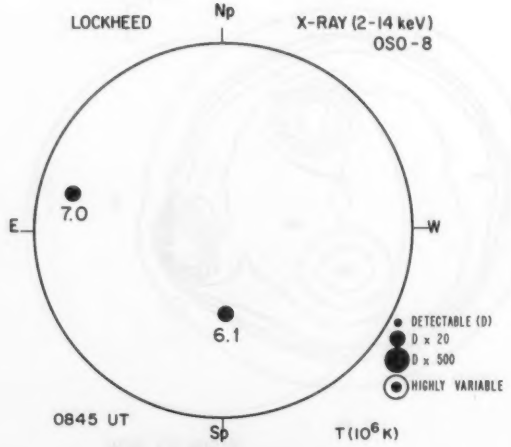

1647 UT

Ant. Temp. Unit 100°K

81
Jun 77

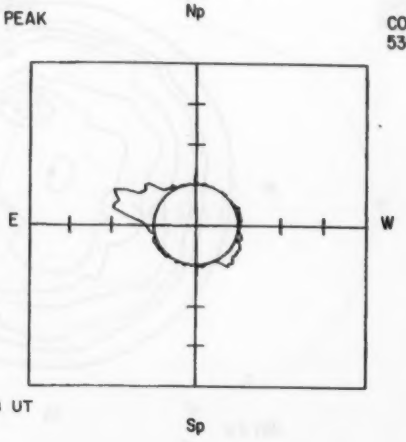
JUNE 25, 1977 (P = -5.46, $B_o$ = 2.22, $L_o$ = 208.52)

LOCKHEED X-RAY (2-14 keV) OSO-8



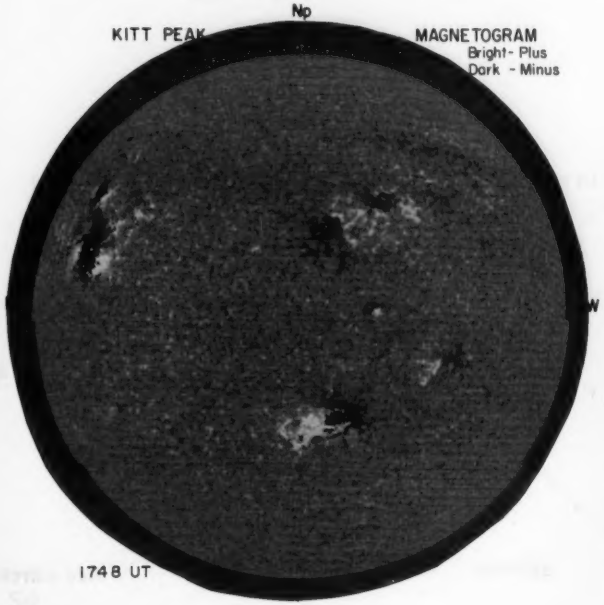

0845 UT T($10^6$ K)

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å




1548 UT

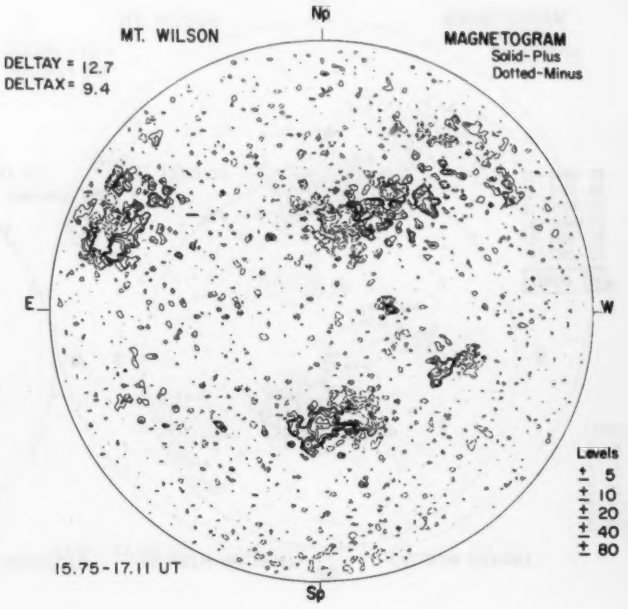
KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus




1748 UT

MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

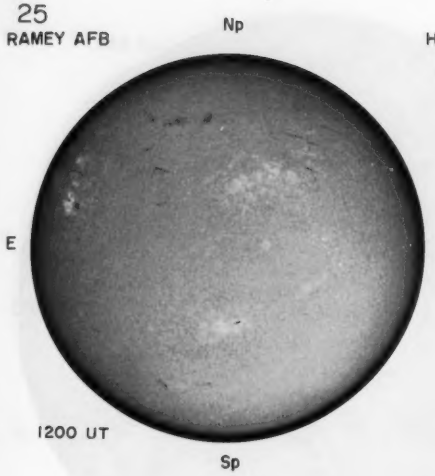
DELTAY = 12.7
DELTAX = 9.4




15.75 - 17.11 UT

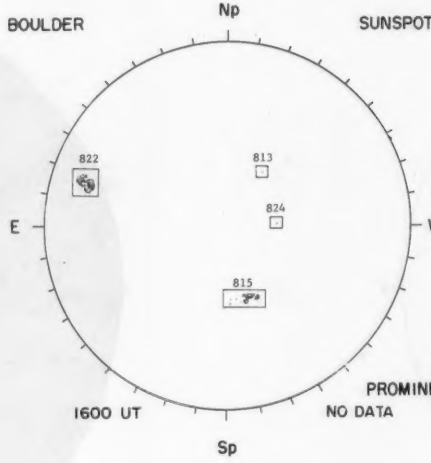
25

RAMEY AFB



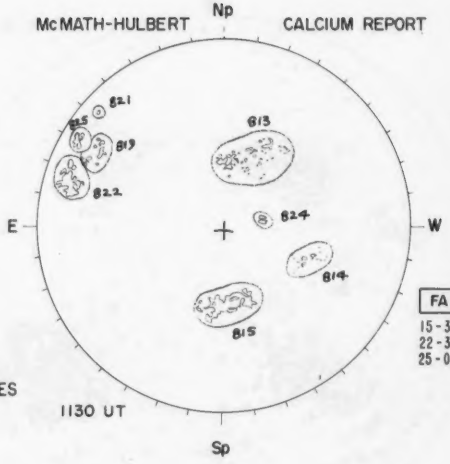

1200 UT

Hα BOULDER




1600 UT

SUNSPOTS




1130 UT

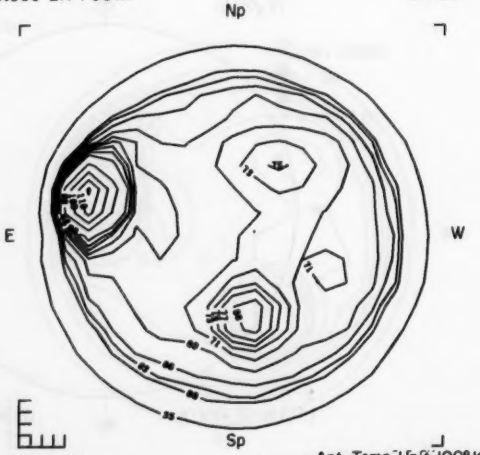
McMATH-HULBERT CALCIUM REPORT

| FAIR | M |
|---|---|
| 15 - 3100 - 3.5 | |
| 22 - 3000 - 3.5 | |
| 25 - 0500 - 3.0 | |

PROMINENCES

NO DATA

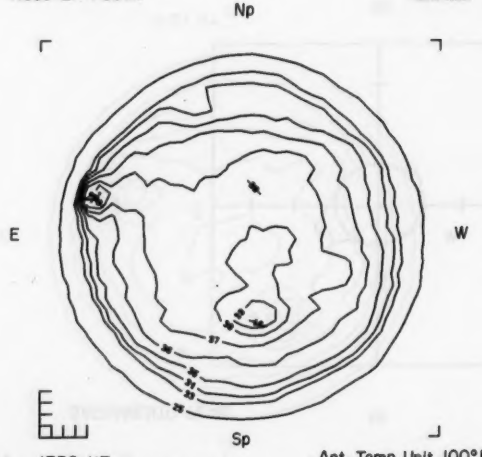
NOSC LA POSTA 2.0 CM




1649 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM

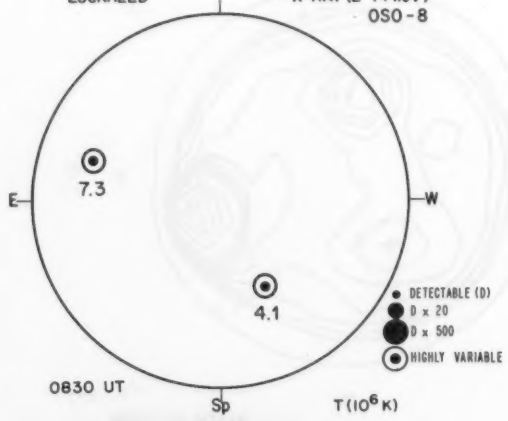



1738 UT

Ant. Temp. Unit 100°K

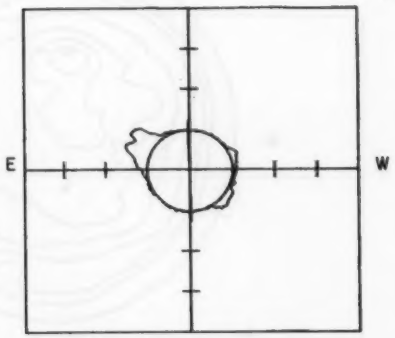
JUNE 26, 1977 (P = -5.01, $B_o$ = 2.34, $L_o$ = 195.28)

LOCKHEED X-RAY (2-14 keV) OSO-8



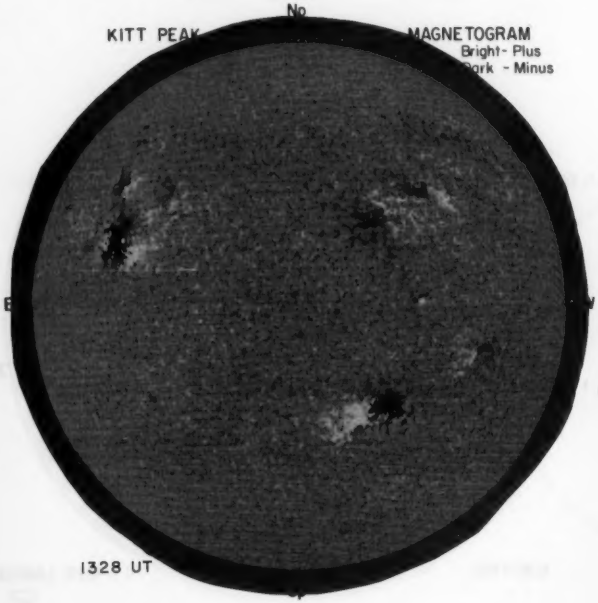

0830 UT T($10^6$ K)

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å




1431 UT

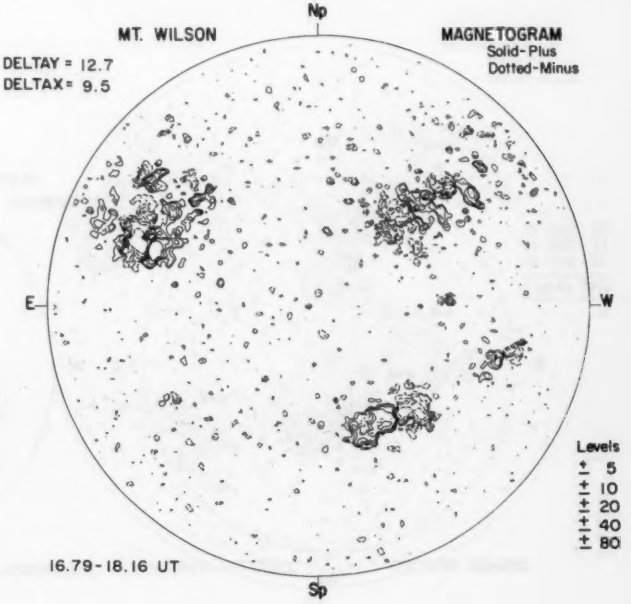
KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus




1328 UT

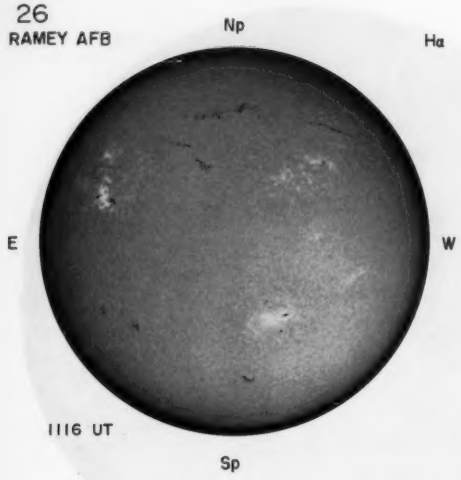
MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

DELTAY = 12.7
DELTAX = 9.5



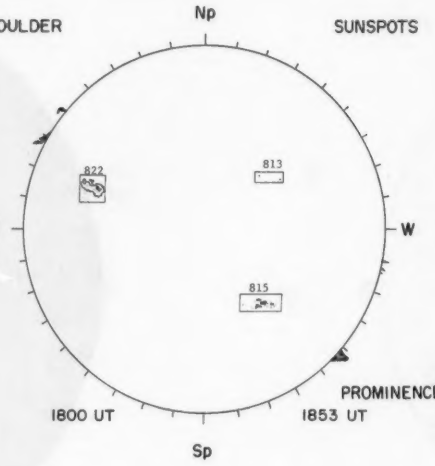

16.79 - 18.16 UT

RAMEY AFB




1116 UT

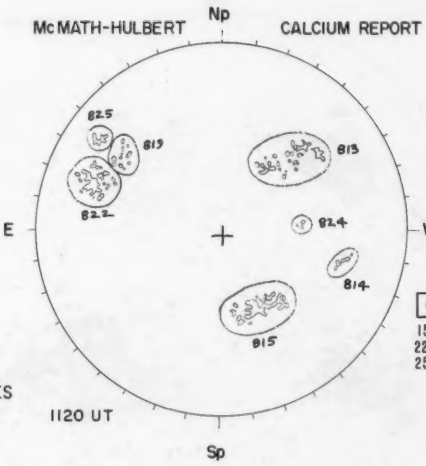
Hα BOULDER




1800 UT

SUNSPOTS

McMATH-HULBERT




1120 UT

CALCIUM REPORT

| GOOD | D |
|---|---|

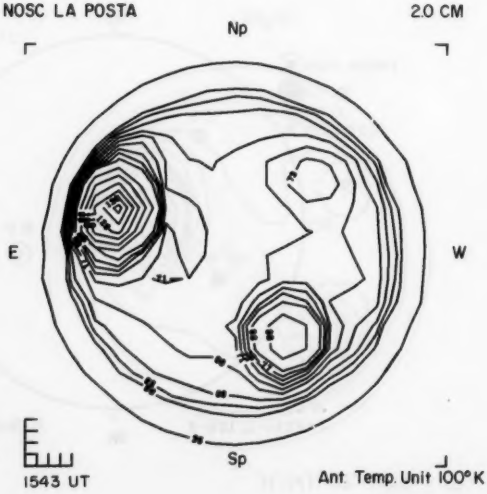
15-2800 - 3.5
22-3000 - 3.5
25-0700 - 3.0

PROMINENCES

1853 UT

NOSC LA POSTA

2.0 CM

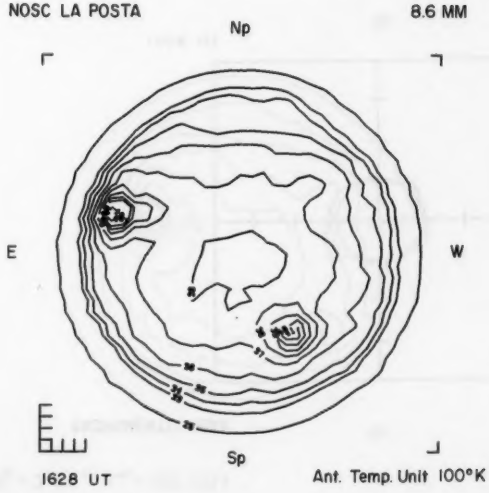



1543 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

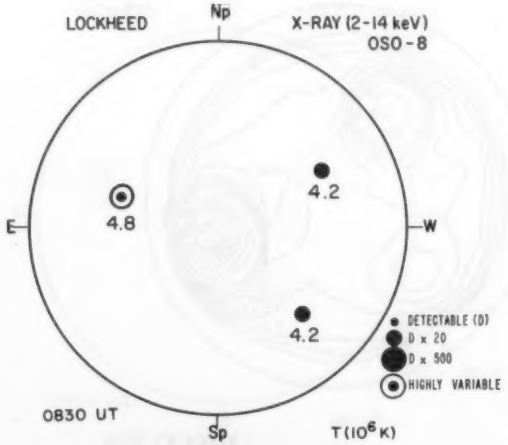



1628 UT

Ant. Temp. Unit 100°K

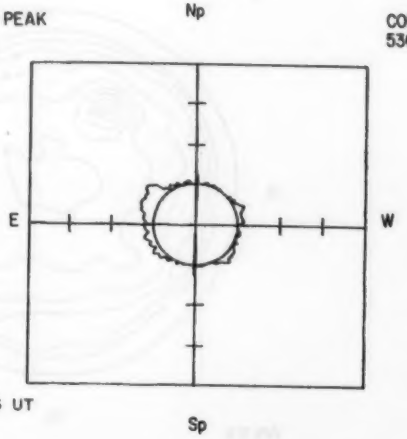
## JUNE 27, 1977 (P = -4.56, $B_o$ = 2.45, $L_o$ = 182.05)

LOCKHEED X-RAY (2-14 keV) OSO-8



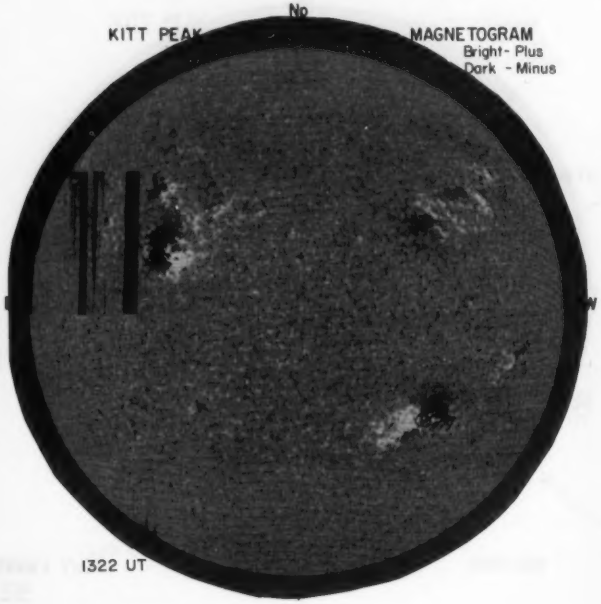

0830 UT T($10^6$K)

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å




1406 UT

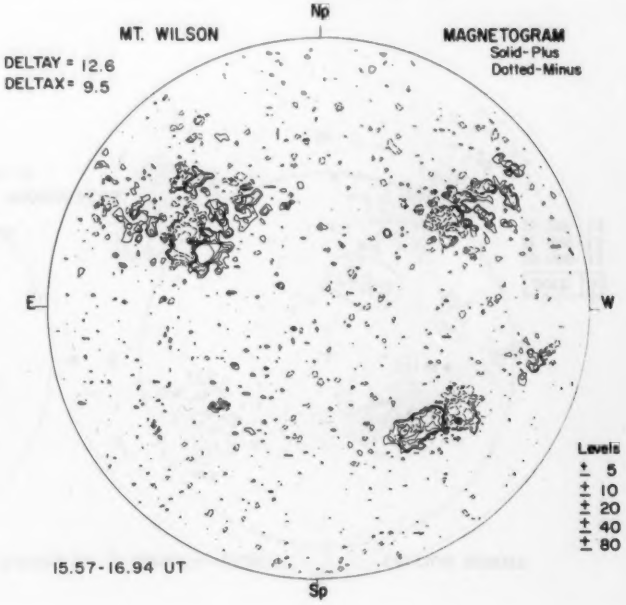
KITT PEAK MAGNETOGRAM Bright - Plus Dark - Minus




1322 UT

MT. WILSON MAGNETOGRAM Solid - Plus Dotted - Minus

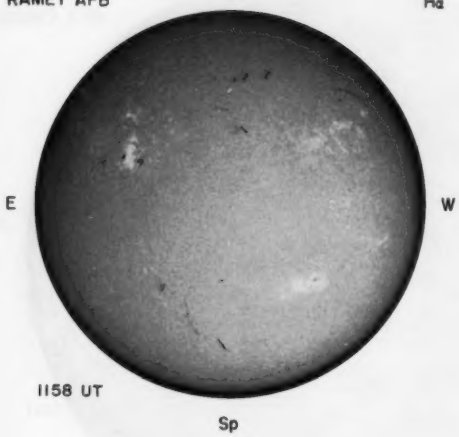
DELTAY = 12.6
DELTAX = 9.5




15.57-16.94 UT

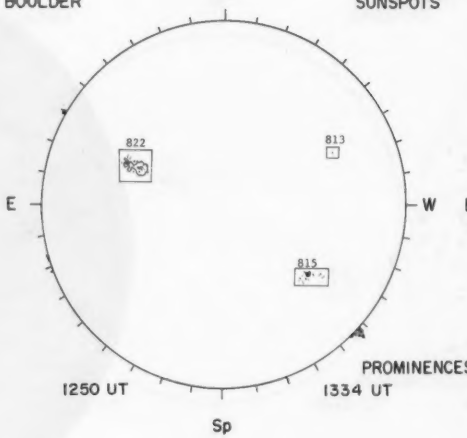
27

RAMEY AFB




1158 UT

Hα BOULDER



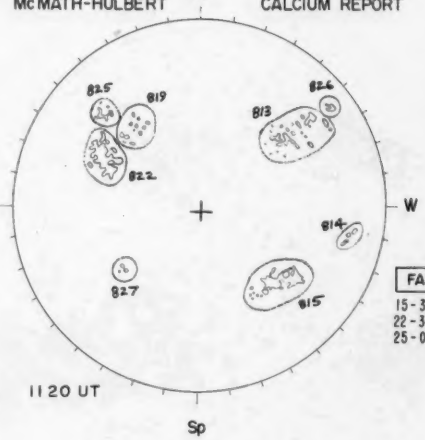

1250 UT

SUNSPOTS

PROMINENCES

1334 UT

McMATH-HULBERT




1120 UT

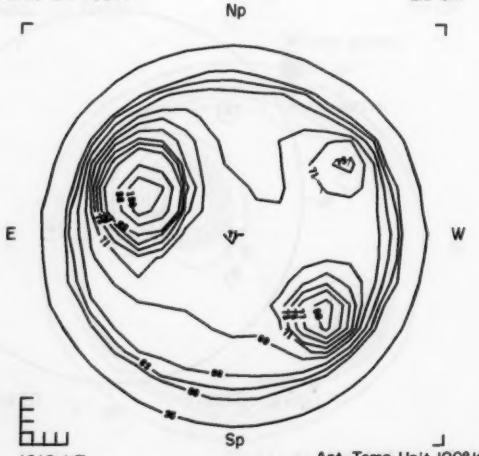
CALCIUM REPORT

FAIR | D

15 - 3100 - 3.5
22 - 3000 - 3.5
25 - 0700 - 2.5

NOSC LA POSTA

2.0 CM

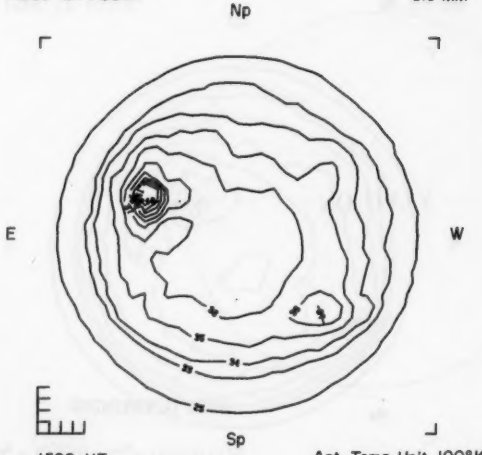



1618 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM



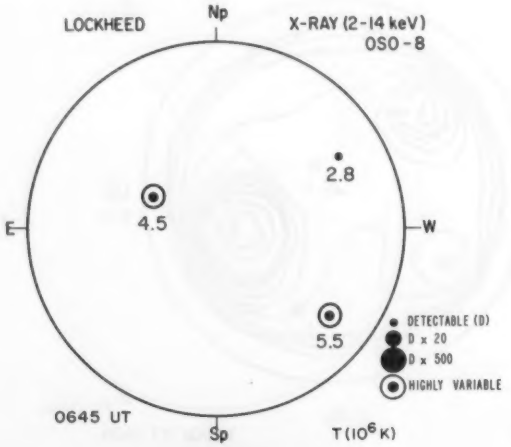

1509 UT

Ant. Temp. Unit 100°K

87
Jun 77

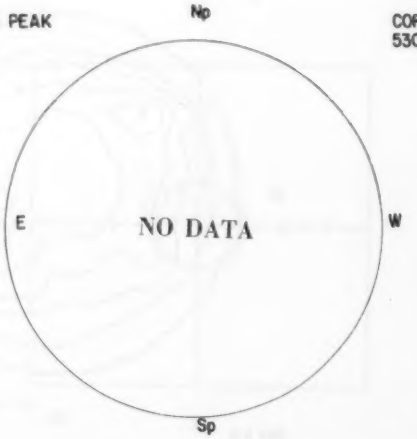
JUNE 28, 1977 (P = -4.11, $B_0$ = 2.56, $L_0$ = 168.81)

LOCKHEED X-RAY (2-14 keV) OSO-8

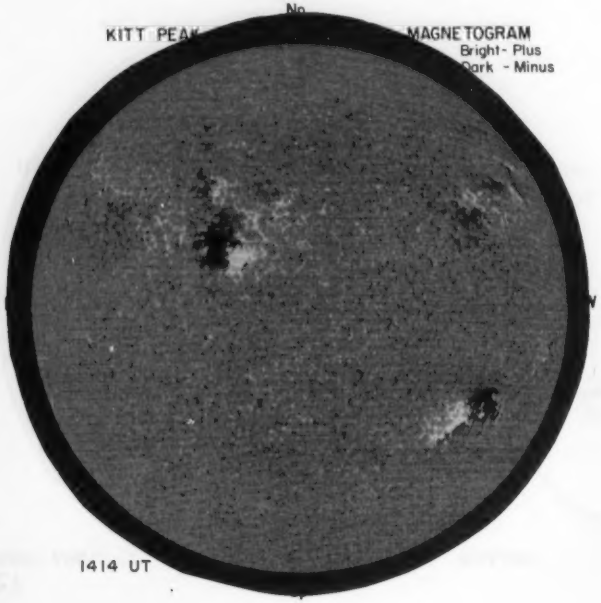



0645 UT T($10^6$ K)

SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

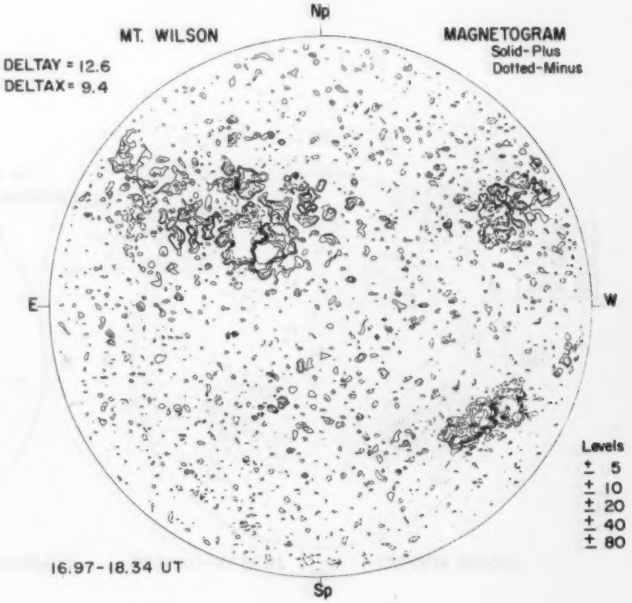



KITT PEAK MAGNETOGRAM
Bright - Plus
Dark - Minus



1414 UT

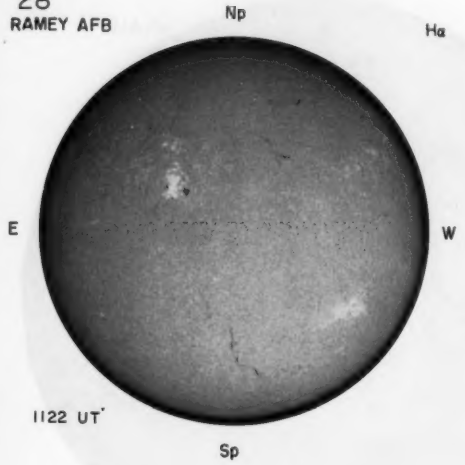
MT. WILSON MAGNETOGRAM
Solid - Plus
Dotted - Minus
DELTAY = 12.6
DELTAX = 9.4




16.97-18.34 UT

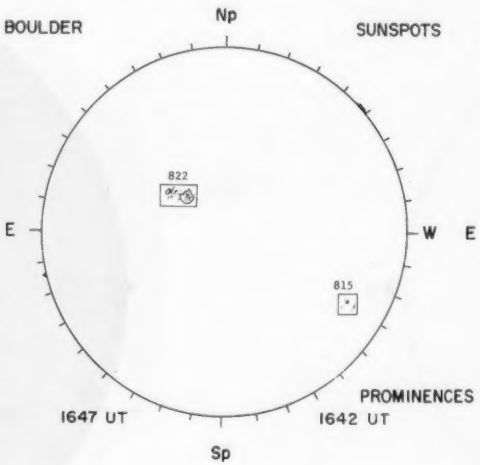
28

RAMEY AFB




1122 UT

Hα BOULDER



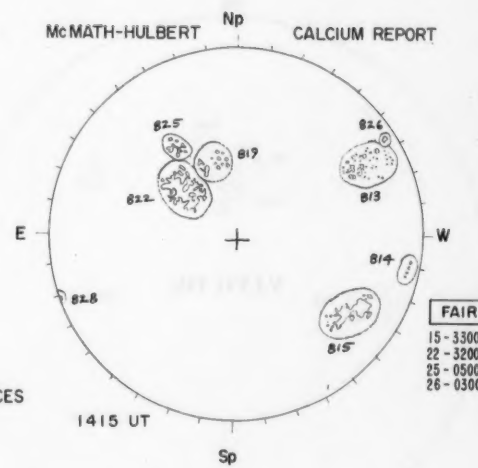

1647 UT

SUNSPOTS

PROMINENCES

1642 UT

McMATH-HULBERT

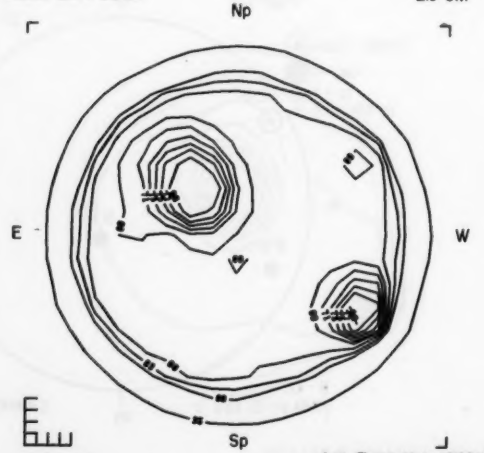



1415 UT

CALCIUM REPORT

| FAIR | S |
|---|---|
| 15 - 3300 - 3.5 | |
| 22 - 3200 - 3.5 | |
| 25 - 0500 - 2.5 | |
| 26 - 0300 - 2.5 | |

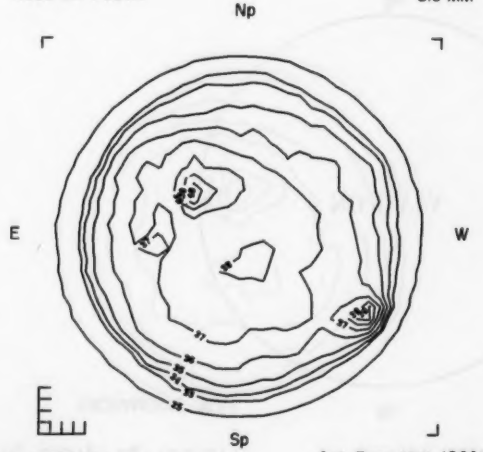
NOSC LA POSTA 2.0 CM




1907 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



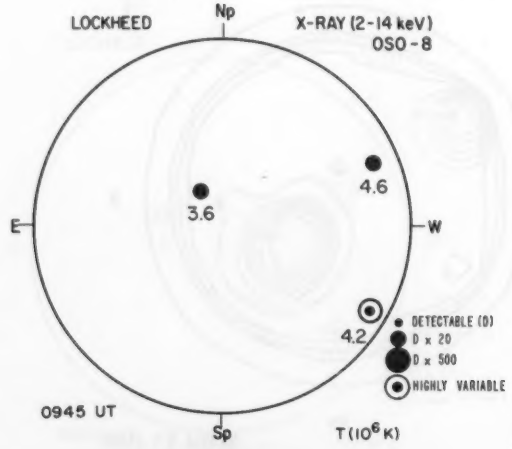

1757 UT

Ant. Temp. Unit 100°K

JUNE 29, 1977 (P = -3.65, $B_o$ = 2.67, $L_o$ = 155.57)

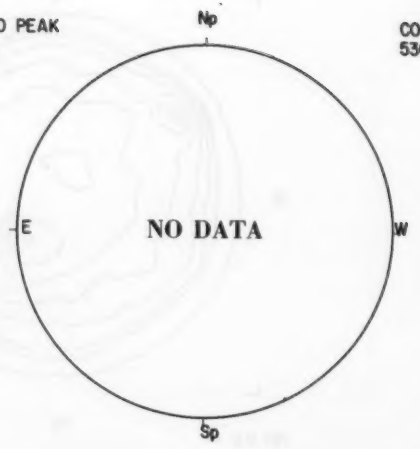
LOCKHEED

X-RAY (2-14 keV)
OSO-8



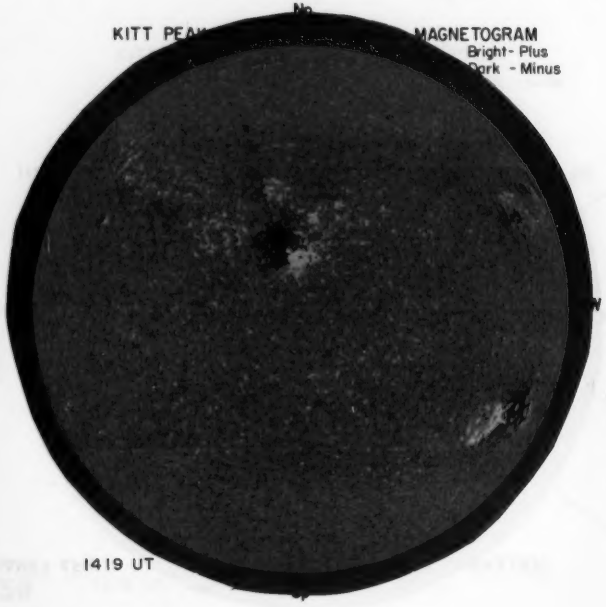

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å




KITT PEAK

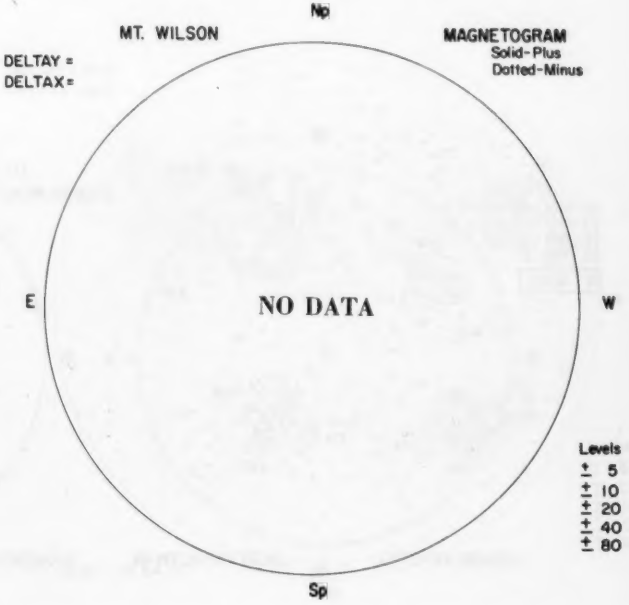
MAGNETOGRAM
Bright - Plus
Dark - Minus




MT. WILSON

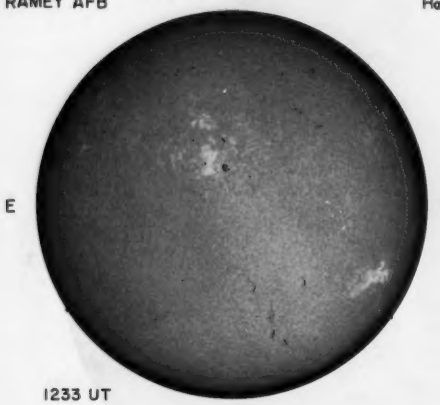
DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus



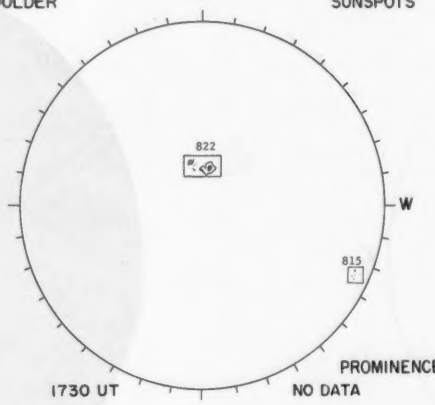
29

RAMEY AFB




1233 UT

Hα BOULDER




1730 UT

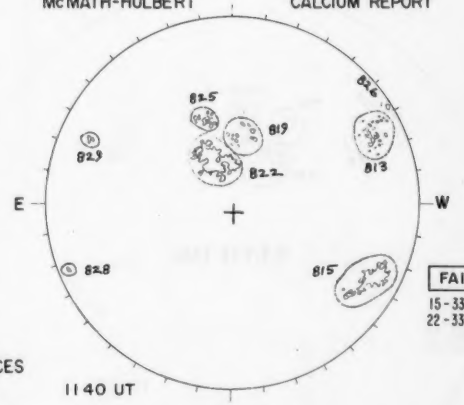
SUNSPOTS

PROMINENCES

NO DATA

McMATH-HULBERT

CALCIUM REPORT



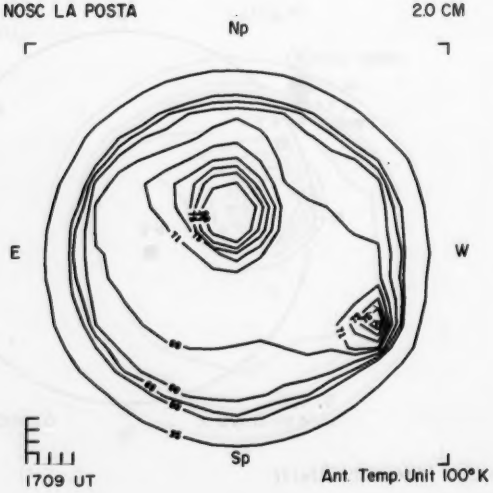

1140 UT

FAIR | S

15 - 3300 - 3.5

22 - 3300 - 3.5

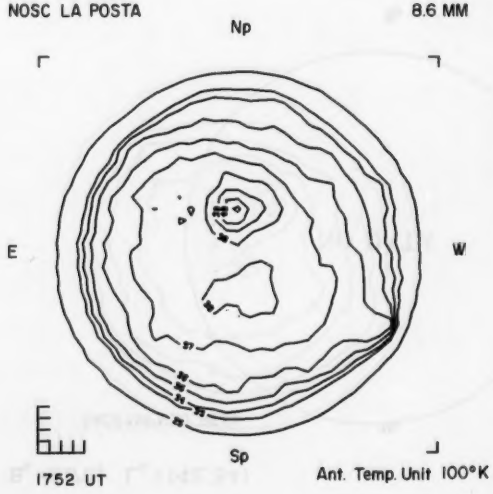
NOSC LA POSTA 2.0 CM




1709 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA 8.6 MM



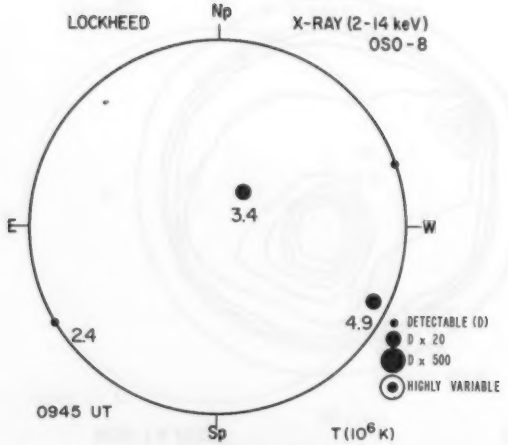

1752 UT

Ant. Temp. Unit 100°K

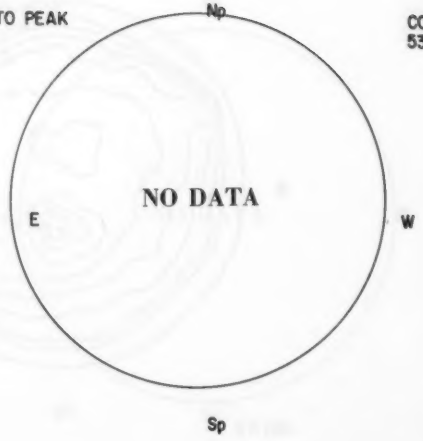
91 Jun 77

JUNE 30, 1977 (P = -3.20, $B_0$ = 2.79, $L_0$ = 142.34)

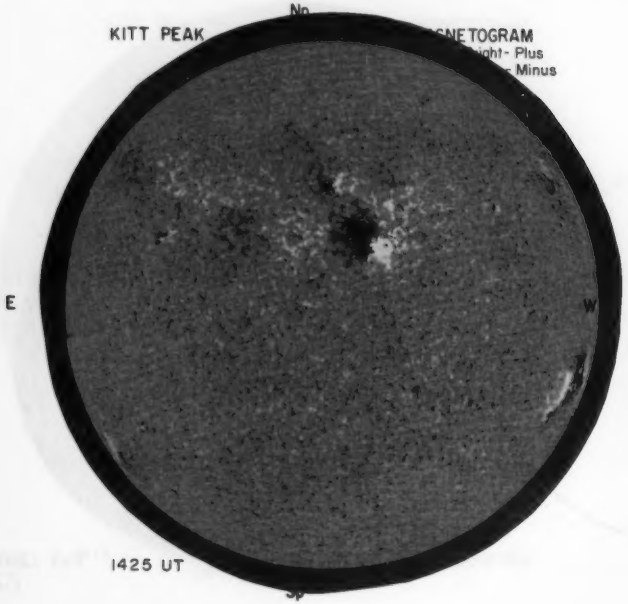
LOCKHEED X-RAY (2-14 keV) OSO-8




SACRAMENTO PEAK CORONA (1.15 $R_\odot$) 5303 Å

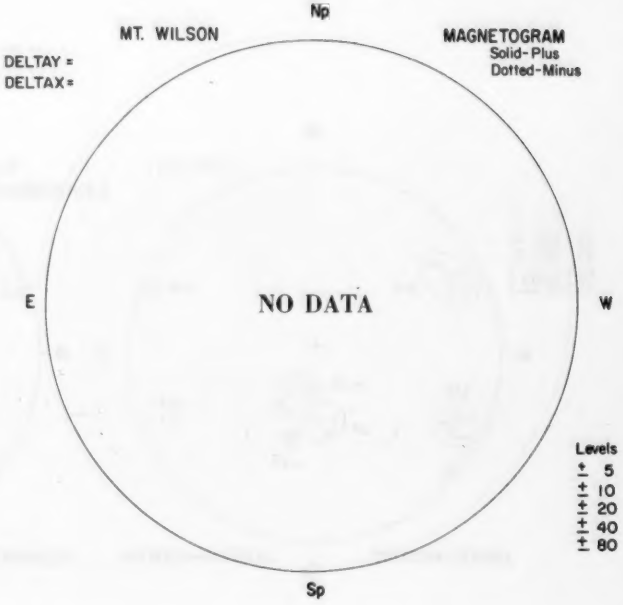



KITT PEAK MAGNETOGRAM ...ght- Plus ...- Minus



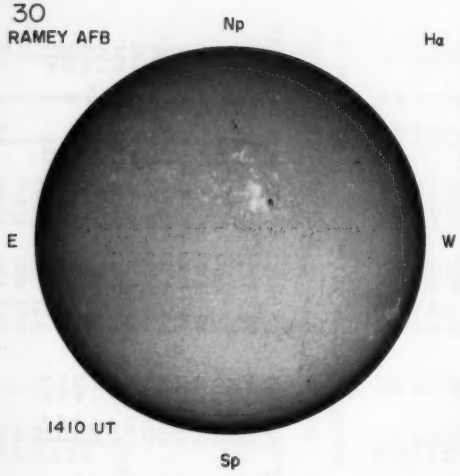

MT. WILSON MAGNETOGRAM Solid-Plus Dotted-Minus

DELTAY =
DELTAX =



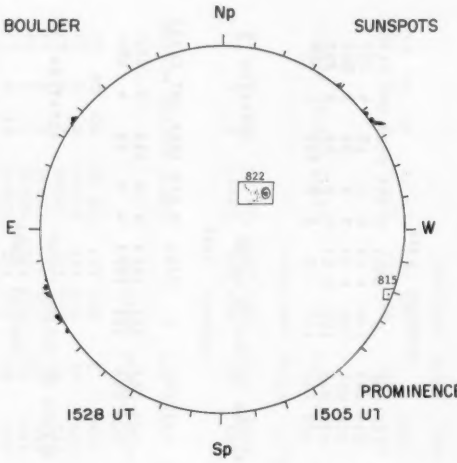
30

RAMEY AFB




1410 UT

Hα BOULDER




1528 UT

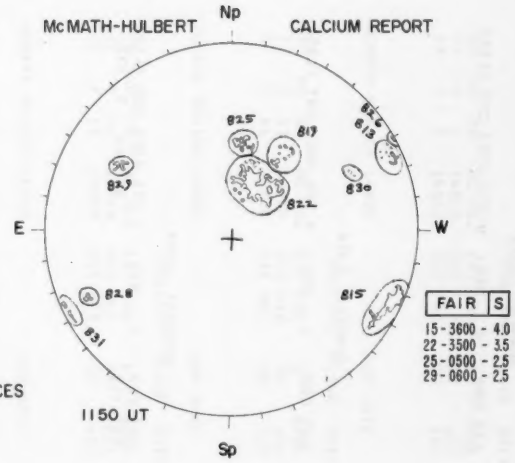
SUNSPOTS

PROMINENCES

1505 UT

McMATH-HULBERT

CALCIUM REPORT



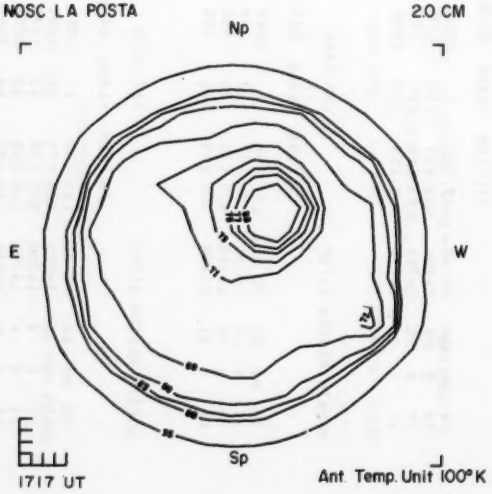

1150 UT

FAIR | S

15 - 3600 - 4.0
22 - 3500 - 3.5
25 - 0500 - 2.5
29 - 0600 - 2.5

NOSC LA POSTA

2.0 CM

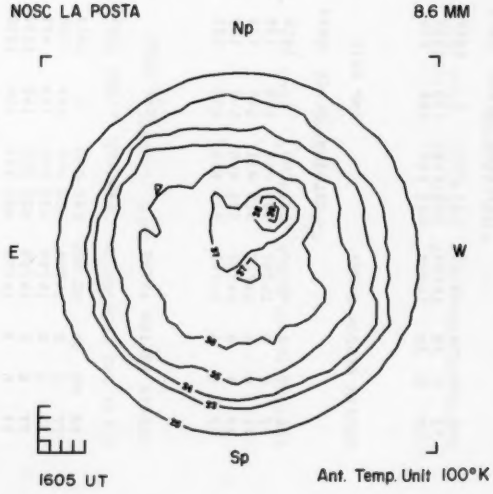



1717 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM




1605 UT

Ant. Temp. Unit 100°K

# REGIONS OF SOLAR ACTIVITY

## JUNE 1977

MCMATH REGION 14798 CMP DATE 1.5

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 5 | 14798 | N29 W56 | 159 | 100 | 2.5 | | | | | | | | | |
| 77 | 6 | 6 | 14798 | N30 W68 | 159 | 100 | 1.5 | | | | | | | | | |

MCMATH REGION 14793 CMP DATE 1.7

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 5 | 29 | 14793 | N05 E42 | 158 | 100 | 1.5 | | | | | | | | | |
| 77 | 5 | 30 | 14793 | N05 E29 | 158 | 100 | 1.0 | | | | | | | | | |

MCMATH REGION 14797 CMP DATE 2.2

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 3 | 14797 | S05 W17 | 149 | 100 | 2.0 | | S05 W19 | | | | B | 10 | 3 | BXO |
| 77 | 6 | 4 | 14797 | S05 W31 | 149 | 100 | 2.0 | | | | | | | | | |
| 77 | 6 | 5 | 14797 | S05 W46 | 149 | 100 | 1.0 | | | | | | | | | |
| 77 | 6 | 6 | 14797 | S05 W61 | 152 | 100 | 1.0 | | | | | | | | | |

MCMATH REGION 14799 CMP DATE 2.6

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 5 | 14799 | N20 W42 | 145 | 200 | 3.0 | 19793 | N19 W43 | 144 | ( B) | 4 | B | 10 | 4 | CSO |
| 77 | 6 | 6 | 14799 | N20 W55 | 146 | 400 | 3.5 | 19793 | N20 W59 | 146 | ( B) | 3 | B | 30 | 5 | BXO |
| 77 | 6 | 7 | 14799 | N20 W67 | 146 | 1000 | 3.5 | 19793 | N20 W68 | 145 | ( B) | 4 | B | 50 | 6 | BXO |
| 77 | 6 | 8 | 14799 | N21 W80 | 144 | 1300 | 3.5 | 19793 | N20 W83 | 147 | B | 3 | B | 120 | 1 | HSX |

MCMATH REGION 14794 CMP DATE 4.7 RETURN OF REGION 14769 ROTATION 2

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 5 | 29 | 14794 | N19 E85 | 115 | 600 | 3.0 | | | | | | | | | |
| 77 | 5 | 30 | 14794 | N19 E71 | 116 | 700 | 3.5 | 19790 | N21 E63 | 121 | (BP) | 4 | B | 100 | 2 | CRO |
| 77 | 5 | 31 | 14794 | N20 E55 | 119 | 1000 | 3.0 | 19790 | N20 E48 | 124 | (BP) | 4 | R | 20 | 4 | CRO |

MCMATH REGION 14795 CMP DATE 5.3 RETURN OF REGION 14749 ROTATION 2

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 5 | 29 | 14795 | N33 E87 | 113 | 400 | 1.0 | | | | | | | | | |
| 77 | 5 | 30 | 14795 | N33 E73 | 114 | 600 | 1.5 | | | | | | | | | |
| 77 | 5 | 31 | 14795 | N34 E63 | 111 | 800 | 1.5 | | | | | | | | | |

MCMATH REGION 14796 CMP DATE 8.8 RETURN OF REGION 14768 ROTATION 2

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 2 | 14796 | S25 E79 | 61 | 1600 | 4.0 | 19792 | S26 E78 | 65 | (AP) | 4 | B | 90 | 3 | CAI |
| 77 | 6 | 3 | 14796 | S25 E70 | 62 | 1800 | 4.0 | 19792 | S25 E63 | 67 | (BP) | 4 | B | 160 | 16 | CSI |
| 77 | 6 | 4 | 14796 | S25 E56 | 62 | 2200 | 4.0 | 19792 | S24 E52 | 66 | (BP) | 4 | B | 270 | 27 | DSI |
| 77 | 6 | 5 | 14796 | S24 E37 | 66 | 2400 | 4.0 | 19792 | S24 E36 | 65 | ( B) | 4 | B | 280 | 24 | EAI |
| 77 | 6 | 6 | 14796 | S25 E25 | 66 | 2400 | 4.0 | 19792 | S25 E22 | 65 | ( B) | 5 | B | 260 | 18 | EAO |
| 77 | 6 | 7 | 14796 | S25 E15 | 64 | 2400 | 3.5 | 19792 | S25 E14 | 63 | ( B) | 4 | B | 320 | 17 | EAO |
| 77 | 6 | 8 | 14796 | S25 E03 | 61 | 2500 | 3.5 | 19792 | S25 E00 | 64 | (BY) | 5 | B | 220 | 16 | DAO |
| 77 | 6 | 9 | 14796 | S25 W10 | 63 | 2400 | 3.0 | 19792 | S25 W16 | 63 | ( B) | 4 | B | 160 | 18 | DAO |
| 77 | 6 | 10 | 14796 | S25 W23 | 63 | 2600 | 3.0 | 19792 | S24 W25 | 63 | ( B) | 5 | B | 130 | 21 | DSI |
| 77 | 6 | 11 | 14796 | S25 W36 | 62 | 2400 | 3.0 | 19792 | S24 W38 | 63 | (BP) | 4 | B | 100 | 13 | CAI |
| 77 | 6 | 12 | 14796 | | | | | 19792 | S24 W52 | 63 | (BP) | 4 | B | 80 | 7 | DAO |
| 77 | 6 | 13 | 14796 | S25 W60 | 60 | 2100 | 3.0 | 19792 | S24 W65 | 63 | (BP) | 4 | B | 110 | 2 | CAO |
| 77 | 6 | 14 | 14796 | S25 W74 | 62 | 1600 | 3.0 | 19792 | S24 W77 | 63 | BP | 3 | B | 210 | 1 | HSX |
| 77 | 6 | 15 | 14796 | S25 W87 | 62 | 1000 | 1.0 | | | | | | | | | |

# REGIONS OF SOLAR ACTIVITY

## JUNE 1977

MCMATH REGION 14802 CMP DATE 9.5

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 8 | 14802 | S08 E12 | 52 | 100 | 1.0 | | | | | | | | | |
| 77 | 6 | 9 | 14802 | S08 E00 | 53 | 100 | 1.0 | | | | | | | | | |

MCMATH REGION 14806 CMP DATE 9.5

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 13 | 14806 | S12 W53 | 53 | 100 | 1.5 | 19795 | S12 W55 | 53 | (AP) | 2 | | | | |
| 77 | 6 | 14 | 14806 | S12 W67 | 55 | 100 | 1.0 | | | | | | | | | |

MCMATH REGION 14809 CMP DATE 9.9

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 14 | 14809 | N21 W61 | 49 | 200 | 2.0 | | | | | | | | | |
| 77 | 6 | 15 | 14809 | N20 W73 | 48 | 400 | 1.5 | | | | | | | | | |

MCMATH REGION 14800 CMP DATE 10.0

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 5 | 14800 | S06 E56 | 47 | 100 | 1.0 | | | | | | | | | |

MCMATH REGION 14803 CMP DATE 11.9

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 8 | 14803 | S10 E44 | 20 | 200 | 1.0 | | | | | | | | | |

MCMATH REGION 14805 CMP DATE 12.0 RETURN OF REGION 14771* ROTATION 3

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 6 | 14805 | S21 E72 | 19 | 600 | 2.0 | | | | | | | | | |
| 77 | 6 | 7 | 14805 | S21 E58 | 21 | 800 | 1.5 | | | | | | | | | |
| 77 | 6 | 8 | 14805 | S20 E45 | 19 | 900 | 1.5 | | | | | | | | | |
| 77 | 6 | 9 | 14805 | S21 E33 | 20 | 800 | 1.0 | | | | | | | | | |
| 77 | 6 | 10 | 14805 | S21 E20 | 20 | 800 | 1.0 | | | | | | | | | |
| 77 | 6 | 11 | 14805 | S21 E06 | 20 | 800 | 1.0 | | | | | | | | | |
| 77 | 6 | 13 | 14805 | S20 W22 | 22 | 600 | 1.0 | | | | | | | | | |
| 77 | 6 | 14 | 14805 | S21 W33 | 21 | 500 | 1.5 | | | | | | | | | |
| 77 | 6 | 15 | 14805 | S22 W45 | 20 | 500 | 1.0 | | | | | | | | | |
| 77 | 6 | 16 | 14805 | S22 W60 | 19 | 300 | 1.0 | | | | | | | | | |
| 77 | 6 | 17 | 14805 | S21 W70 | 18 | 200 | 1.0 | | | | | | | | | |

MCMATH REGION 14811 CMP DATE 13.2

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 16 | 14811 | N17 W47 | 6 | 100 | 1.0 | | | | | | | | | |

MCMATH REGION 14801 CMP DATE 13.4 RETURN OF REGION 14771* ROTATION 3

| | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 6 | 14801 | S22 E85 | 6 | 500 | 2.0 | 19794 | S21 E80 | 7 | AP | 4 | | | | |
| 77 | 6 | 7 | 14801 | S23 E78 | 1 | 2900 | 3.5 | 19794 | S22 E75 | 2 | (BP) | 4 | B | 150 | 2 | CAO |
| 77 | 6 | 8 | 14801 | S23 E64 | 0 | 3000 | 3.5 | 19794 | S22 E61 | 3 | (BP) | 5 | B | 120 | 5 | DAO |
| 77 | 6 | 9 | 14801 | S24 E52 | 1 | 3000 | 3.5 | 19794 | S22 E44 | 3 | (BP) | 5 | B | 120 | 5 | DAO |
| 77 | 6 | 10 | 14801 | S24 E39 | 1 | 3200 | 3.5 | 19794 | S21 E34 | 4 | (BP) | 5 | B | 160 | 3 | CAO |
| 77 | 6 | 11 | 14801 | S24 E26 | 0 | 2700 | 3.0 | 19794 | S21 E21 | 4 | (BP) | 5 | B | 150 | 4 | CSO |

(Cont'd)

# REGIONS OF SOLAR ACTIVITY

## JUNE 1977

MCMATH REGION 14801 (CONT) CMP DATE 13.4 RETURN OF REGION 14771* ROTATION 3

| CALCIUM PLAGE DATA | | | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 12 | 14801 | | | | | 19794 | S21 E08 | 3 | (AP) | 5 | B | 200 | 2 | HAX |
| 77 | 6 | 13 | 14801 | S23 W01 | 1 | 2400 | 3.0 | 19794 | S21 W05 | 3 | (BP) | 5 | B | 90 | 5 | CSO |
| 77 | 6 | 14 | 14801 | S23 W14 | 2 | 2100 | 3.0 | 19794 | S22 W18 | 4 | (BP) | 5 | B | 60 | 1 | HSX |
| 77 | 6 | 15 | 14801 | S23 W27 | 2 | 2400 | 3.0 | 19794 | S22 W32 | 5 | ( Y) | 5 | B | 150 | 3 | CSX |
| 77 | 6 | 16 | 14801 | S23 W43 | 2 | 2400 | 3.0 | 19794 | S22 W45 | 5 | (BP) | 4 | B | 80 | 1 | HAX |
| 77 | 6 | 17 | 14801 | S23 W54 | 2 | 2300 | 3.0 | 19794 | S22 W58 | 4 | (AP) | 4 | B | 110 | 1 | HSX |
| 77 | 6 | 18 | 14801 | S23 W67 | 1 | 2300 | 3.0 | 19794 | S22 W71 | 4 | (AP) | 3 | B | 140 | 1 | HSX |
| 77 | 6 | 19 | 14801 | S23 W80 | 2 | 800 | 2.0 | 19794 | S21 W85 | 5 | AP | 3 | | | | |

MCMATH REGION 14812 CMP DATE 14.0

| CALCIUM PLAGE DATA | | | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 16 | 14812 | S05 W36 | 355 | 100 | 1.5 | | | | | | | | | |
| 77 | 6 | 17 | 14812 | S05 W48 | 356 | 100 | 1.5 | | | | | | | | | |

MCMATH REGION 14807 CMP DATE 14.3

| CALCIUM PLAGE DATA | | | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 13 | 14807 | N35 E11 | 350 | 100 | 1.5 | 19796 | N34 E11 | 348 | (AF) | 2 | | | | |
| 77 | 6 | 14 | 14807 | N35 W01 | 349 | 300 | 2.0 | 19796 | N34 W02 | 348 | ( B) | 2 | | | | |
| 77 | 6 | 15 | 14807 | N35 W13 | 348 | 200 | 2.0 | | | | | | | | | |
| 77 | 6 | 16 | 14807 | N34 W28 | 347 | 100 | 1.0 | | | | | | | | | |
| 77 | 6 | 17 | 14807 | N35 W39 | 347 | 300 | 1.5 | | | | | | | | | |
| 77 | 6 | 18 | 14807 | N35 W53 | 347 | 200 | 1.5 | | | | | | | | | |
| 77 | 6 | 19 | 14807 | N35 W67 | 349 | 200 | 1.0 | | | | | | | | | |

MCMATH REGION 14804 CMP DATE 14.9 RETURN OF REGION 14784 ROTATION 2

| CALCIUM PLAGE DATA | | | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 8 | 14804 | N25 E85 | 340 | 500 | 1.0 | | | | | | | | | |
| 77 | 6 | 9 | 14804 | N25 E72 | 342 | 400 | 1.5 | | | | | | | | | |
| 77 | 6 | 10 | 14804 | N25 E60 | 341 | 300 | 1.0 | | | | | | | | | |
| 77 | 6 | 11 | 14804 | N25 E45 | 342 | 300 | 1.0 | | | | | | | | | |
| 77 | 6 | 13 | 14804 | N26 E14 | 343 | 400 | 1.0 | | | | | | | | | |

MCMATH REGION 14817 CMP DATE 19.4

| CALCIUM PLAGE DATA | | | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 21 | 14817 | N26 W27 | 283 | 100 | 1.5 | | | | | | | | | |
| 77 | 6 | 22 | 14817 | N26 W41 | 283 | 100 | 1.5 | | | | | | | | | |

MCMATH REGION 14810 CMP DATE 21.7

| CALCIUM PLAGE DATA | | | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 15 | 14810 | N33 E82 | 253 | 700 | 2.0 | | | | | | | | | |
| 77 | 6 | 16 | 14810 | N33 E65 | 254 | 500 | 1.5 | | | | | | | | | |
| 77 | 6 | 17 | 14810 | N33 E55 | 253 | 400 | 1.5 | | | | | | | | | |
| 77 | 6 | 18 | 14810 | N33 E40 | 254 | 500 | 1.5 | | | | | | | | | |
| 77 | 6 | 19 | 14810 | N32 E27 | 255 | 500 | 2.0 | | | | | | | | | |
| 77 | 6 | 20 | 14810 | N31 E15 | 254 | 500 | 1.5 | | | | | | | | | |
| 77 | 6 | 21 | 14810 | N31 E03 | 253 | 500 | 2.0 | | | | | | | | | |
| 77 | 6 | 22 | 14810 | N30 W10 | 252 | 300 | 1.0 | | | | | | | | | |
| 77 | 6 | 23 | 14810 | N31 W23 | 251 | 300 | 1.0 | | | | | | | | | |

MCMATH REGION 14818 CMP DATE 22.9

| CALCIUM PLAGE DATA | | | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 21 | 14818 | S25 E19 | 237 | 100 | 1.0 | | | | | | | | | |

# REGIONS OF SOLAR ACTIVITY

## JUNE 1977

MCMATH REGION 14826 CMP DATE 23.1

| CALCIUM PLAGE DATA | | | | | | | SUNSPOT DATA | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 27 | 14826 | N33 W58 | 234 | 400 | 2.0 | 19805 | N32 W59 | 234 | (AP) | 2 | | | | |
| 77 | 6 | 28 | 14826 | N33 W70 | 232 | 300 | 2.5 | | | | | | | | | |
| 77 | 6 | 29 | 14826 | N33 W82 | 232 | 300 | 1.5 | | | | | | | | | |
| 77 | 6 | 30 | 14826 | N32 W90 | 227 | 100 | 1.0 | | | | | | | | | |

MCMATH REGION 14816 CMP DATE 23.2

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 19 | 14816 | S32 E48 | 234 | 100 | 2.0 | | | | | | | | | |
| 77 | 6 | 20 | 14816 | S32 E36 | 233 | 100 | 1.5 | | | | | | | | | |

MCMATH REGION 14814 CMP DATE 23.5

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 17 | 14814 | S09 E85 | 223 | 1000 | 2.5 | | | | | | | | | |
| 77 | 6 | 18 | 14814 | S09 E67 | 227 | 700 | 2.5 | 19797 | S09 E63 | 230 | (AF) | 1 | | | | |
| 77 | 6 | 19 | 14814 | S09 E53 | 229 | 700 | 2.5 | 19797 | S08 E48 | 232 | (AF) | 2 | | | | |
| 77 | 6 | 20 | 14814 | S09 E40 | 229 | 600 | 2.5 | | | | | | | | | |
| 77 | 6 | 21 | 14814 | S09 E28 | 228 | 700 | 3.0 | | | | | | | | | |
| 77 | 6 | 22 | 14814 | S09 E14 | 228 | 600 | 2.5 | 19801 | S09 E14 | 226 | (AP) | 2 | | | | |
| 77 | 6 | 23 | 14814 | S09 E00 | 228 | 600 | 2.5 | | | | | | | | | |
| 77 | 6 | 25 | 14814 | S09 W26 | 229 | 400 | 1.5 | | | | | | | | | |
| 77 | 6 | 26 | 14814 | S09 W40 | 230 | 300 | 1.5 | | | | | | | | | |
| 77 | 6 | 27 | 14814 | S09 W55 | 231 | 300 | 2.0 | | | | | | | | | |
| 77 | 6 | 28 | 14814 | S09 W70 | 232 | 200 | 1.0 | | | | | | | | | |

MCMATH REGION 14820 CMP DATE 24.2

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 23 | 14820 | S48 E08 | 220 | 200 | 1.5 | | | | | | | | | |

MCMATH REGION 14824 CMP DATE 24.6

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 25 | 14824 | N03 W12 | 215 | 300 | 2.0 | 19804 | N03 W01 | 216 | (AF) | 1 | | | | |
| 77 | 6 | 26 | 14824 | N03 W25 | 215 | 200 | 2.0 | 19804 | N03 W14 | 216 | (AF) | 2 | B | 0 | 2 | AXX |

MCMATH REGION 14813 CMP DATE 24.7 RETURN OF REGION 14785 ROTATION 2

| CALCIUM PLAGE DATA | | | | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 17 | 14813 | N26 E85 | 223 | 900 | 2.5 | | | | | | | | | |
| 77 | 6 | 18 | 14813 | N24 E75 | 219 | 1300 | 2.5 | 19798 | N25 E68 | 225 | (AP) | 3 | B | 10 | 4 | AXX |
| 77 | 6 | | 14813 | | | | | 19799 | N19 E81 | 212 | X | 2 | B | 20 | 1 | AXX |
| 77 | 6 | 19 | 14813 | N25 E64 | 218 | 2800 | 3.0 | 19798 | N27 E62 | 218 | (AF) | 2 | | | | |
| 77 | 6 | | 14813 | | | | | 19799 | N20 E69 | 211 | (AP) | 4 | B | 10 | 1 | AXX |
| 77 | 6 | 20 | 14813 | N25 E51 | 218 | 2800 | 3.0 | 19799 | N20 E56 | 211 | (AP) | 4 | H | 20 | 1 | HRX |
| 77 | 6 | 21 | 14813 | N25 E39 | 217 | 3000 | 3.0 | 19799 | N20 E42 | 212 | (AP) | 4 | B | 40 | 2 | HRX |
| 77 | 6 | 22 | 14813 | N25 E27 | 215 | 2800 | 3.0 | 19799 | N20 E29 | 211 | (BP) | 4 | B | 20 | 1 | AXX |
| 77 | 6 | 23 | 14813 | N24 E14 | 214 | 2800 | 3.5 | 19799 | N21 E18 | 210 | (BP) | 3 | B | 40 | 3 | BXO |
| 77 | 6 | | 14813 | | | | | 19802 | N28 E08 | 220 | (AF) | 2 | | | | |
| 77 | 6 | 24 | 14813 | | | | | 19799 | N19 E03 | 212 | (AP) | 3 | B | 10 | 1 | AXX |
| 77 | 6 | 25 | 14813 | N25 W10 | 213 | 1700 | 2.0 | 19799 | N19 W10 | 212 | (AP) | 3 | B | 10 | 2 | AXX |
| 77 | 6 | 26 | 14813 | N25 W23 | 213 | 1700 | 2.0 | 19799 | N19 W19 | 208 | ( B) | 3 | B | 10 | 2 | BXO |
| 77 | 6 | 27 | 14813 | N25 W36 | 212 | 1700 | 2.0 | | N19 W39 | | | | B | 10 | 1 | AXX |
| 77 | 6 | 28 | 14813 | N25 W50 | 212 | 1300 | 2.0 | | | | | | | | | |
| 77 | 6 | 29 | 14813 | N25 W60 | 210 | 900 | 1.5 | | | | | | | | | |
| 77 | 6 | 30 | 14813 | N25 W73 | 210 | 600 | 1.0 | | | | | | | | | |
| 77 | 7 | 01 | 14813 | N25 W86 | | 400 | 1.0 | | | | | | | | | |

# REGIONS OF SOLAR ACTIVITY

## JUNE 1977

MCMATH REGION 14815 CMP DATE 25.5 RETURN OF REGION 14791 ROTATION 2

| | | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 18 | 14815 | S22 E90 | 204 | 400 | 1.5 | | | | | | | | | |
| 77 | 6 | 19 | 14815 | S23 E77 | 205 | 1800 | 3.5 | 19800 | S21 E75 | 205 | (BP) | 3 | B | 50 | 1 | HSX |
| 77 | 6 | 20 | 14815 | S23 E65 | 204 | 2100 | 3.5 | 19800 | S22 E62 | 205 | (BP) | 4 | H | 160 | 25 | DAI |
| 77 | 6 | 21 | 14815 | S23 E52 | 204 | 2100 | 3.5 | 19800 | S22 E48 | 206 | (BP) | 4 | B | 250 | 21 | CAI |
| 77 | 6 | 22 | 14815 | S23 E40 | 202 | 3000 | 3.5 | 19800 | S22 E35 | 205 | ( D) | 4 | B | 240 | 21 | CAI |
| 77 | 6 | 23 | 14815 | S23 E25 | 203 | 2700 | 3.5 | 19800 | S23 E24 | 204 | ( D) | 4 | B | 300 | 21 | CAI |
| 77 | 6 | 24 | 14815 | | | | | 19800 | S22 E09 | 206 | ( D) | 4 | B | 220 | 22 | EKI |
| 77 | 6 | 25 | 14815 | S23 E00 | 203 | 3100 | 3.5 | 19800 | S22 W04 | 206 | (BP) | 3 | B | 260 | 19 | EKI |
| 77 | 6 | 26 | 14815 | S23 W13 | 203 | 2800 | 3.5 | 19800 | S22 W19 | 208 | ( D) | 3 | B | 210 | 18 | EAI |
| 77 | 6 | 27 | 14815 | S23 W29 | 205 | 3100 | 3.5 | 19800 | S21 W32 | 207 | (BP) | 3 | B | 130 | 16 | CSI |
| 77 | 6 | | 14815 | | | | | | S20 W28 | | | | B | 130 | 16 | DSO |
| 77 | 6 | 28 | 14815 | S23 W42 | 204 | 3300 | 3.5 | 19800 | S20 W47 | 208 | ( Y) | 4 | B | 120 | 6 | CRO |
| 77 | 6 | 29 | 14815 | S23 W54 | 204 | 3300 | 3.5 | | S21 W53 | | | | H | 120 | 16 | DAI |
| 77 | 6 | | 14815 | | | | | | S21 W64 | | | | H | 90 | 11 | DAO |
| 77 | 6 | 30 | 14815 | S24 W67 | 204 | 3600 | 4.0 | 19800 | S19 W71 | 206 | B | 3 | R | 50 | 2 | CRO |
| 77 | 7 | 01 | 14815 | S24 W80 | | 2800 | 3.0 | | | | | | | | | |

MCMATH REGION 14830 CMP DATE 27.3

| | | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 30 | 14830 | N20 W42 | 179 | 100 | 1.5 | | | | | | | | | |
| 77 | 7 | 01 | 14830 | N20 W55 | | 100 | 1.5 | | | | | | | | | |

MCMATH REGION 14833 CMP DATE 28.3

| | | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 7 | 02 | 14833 | S24 W49 | | 200 | 2.5 | 19807 | S26 W49 | | X | 1 | | | | |
| 77 | 7 | 03 | 14833 | S25 W61 | | 200 | 1.0 | | | | | | | | | |
| 77 | 7 | 04 | 14833 | S25 W76 | | 200 | 1.0 | | | | | | | | | |

MCMATH REGION 14819 CMP DATE 29.2 RETURN OF REGION 14799 ROTATION 2

| | | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 22 | 14819 | N25 E90 | 152 | 300 | 1.0 | | | | | | | | | |
| 77 | 6 | 23 | 14819 | N25 E75 | 153 | 600 | 2.0 | | | | | | | | | |
| 77 | 6 | 25 | 14819 | N25 E49 | 154 | 700 | 2.0 | | | | | | | | | |
| 77 | 6 | 26 | 14819 | N25 E37 | 153 | 600 | 1.5 | | | | | | | | | |
| 77 | 6 | 27 | 14819 | N25 E24 | 152 | 600 | 1.0 | | | | | | | | | |
| 77 | 6 | 28 | 14819 | N25 E08 | 154 | 500 | 1.0 | | | | | | | | | |
| 77 | 6 | 29 | 14819 | N25 W04 | 154 | 500 | 1.5 | | | | | | | | | |
| 77 | 6 | 30 | 14819 | N25 W17 | 154 | 500 | 1.5 | | | | | | | | | |

MCMATH REGION 14823 CMP DATE 29.3

| | | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 7 | 01 | 14823 | N23 W24 | | 300 | 1.5 | | | | | | | | | |
| 77 | 7 | 02 | 14823 | N23 W37 | | 200 | 1.0 | | | | | | | | | |
| 77 | 7 | 03 | 14823 | N23 W54 | | 200 | 1.5 | | | | | | | | | |
| 77 | 7 | 04 | 14823 | N23 W68 | | 200 | 1.0 | | | | | | | | | |

MCMATH REGION 14827 CMP DATE 29.4

| | | | | CALCIUM PLAGE DATA | | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 27 | 14827 | S18 E25 | 151 | 200 | 1.0 | | | | | | | | | |

# REGIONS OF SOLAR ACTIVITY

## JUNE 1977

MCMATH REGION 14822 CMP DATE 29.9

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 23 | 14822 | N16 E85 | 143 | 2000 | 3.5 | 19803 | N15 E80 | 148 | ( B) | 4 | B | 350 | 4 | DHI |
| 77 | 6 | 24 | 14822 | | | | | 19803 | N16 E69 | 146 | ( D) | 4 | B | 640 | 24 | EKC |
| 77 | 6 | 25 | 14822 | N16 E59 | 144 | 3000 | 3.5 | 19803 | N15 E55 | 147 | ( D) | 5 | B | 1000 | 29 | EKC |
| 77 | 6 | 26 | 14822 | N16 E46 | 144 | 3000 | 3.5 | 19803 | N15 E44 | 145 | ( D) | 6 | B | 1170 | 27 | DKC |
| 77 | 6 | 27 | 14822 | N16 E32 | 144 | 3000 | 3.5 | 19803 | N16 E30 | 145 | ( D) | 6 | B | 1170 | 31 | EKC |
| 77 | 6 | | 14822 | | | | | | N15 E30 | | | | B | 1170 | 31 | EKC |
| 77 | 6 | 28 | 14822 | N16 E18 | 144 | 3200 | 3.5 | 19803 | N15 E15 | 146 | (BP) | 5 | B | 700 | 36 | DKI |
| 77 | 6 | 29 | 14822 | N16 E05 | 145 | 3300 | 3.5 | | N15 E08 | | | | M | 730 | 36 | DKC |
| 77 | 6 | 30 | 14822 | N16 W08 | 145 | 3500 | 3.5 | 19803 | N15 W11 | 146 | (BP) | 5 | R | 430 | 13 | DKI |
| 77 | 7 | 01 | 14822 | N16 W21 | | 3400 | 3.5 | 19803 | N15 W25 | | (BP) | 5 | B | 440 | 36 | C |
| 77 | 7 | 02 | 14822 | N16 W34 | | 3200 | 3.0 | 19803 | N15 W40 | | (BP) | 4 | B | 350 | 6 | C |
| 77 | 7 | 03 | 14822 | N17 W48 | | 3200 | 3.5 | 19803 | N15 W53 | | (AP) | 5 | B | 310 | 5 | H |
| 77 | 7 | 04 | 14822 | N17 W64 | | 3000 | 3.5 | 19803 | N15 W66 | | (AP) | 4 | B | 290 | 4 | C |
| 77 | 7 | 05 | 14822 | N17 W77 | | 3000 | 3.0 | 19803 | N15 W79 | | (AP) | 4 | B | 150 | 3 | H |
| 77 | 7 | 06 | 14822 | N17 W90 | | 1800 | 1.0 | | | | | | | | | |

MCMATH REGION 14834 CMP DATE 29.9

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 7 | 02 | 14834 | S25 W18 | | 100 | 2.5 | | | | | | | | | |

MCMATH REGION 14821 CMP DATE 30.0

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 23 | 14821 | N40 E85 | 143 | 200 | 1.0 | | | | | | | | | |
| 77 | 6 | 25 | 14821 | N40 E60 | 143 | 100 | 1.0 | | | | | | | | | |

MCMATH REGION 14825 CMP DATE 30.2

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 6 | 23 | 14825 | N28 E90 | 138 | 500 | 2.0 | | | | | | | | | |
| 77 | 6 | 25 | 14825 | N28 E64 | 139 | 500 | 3.0 | | | | | | | | | |
| 77 | 6 | 26 | 14825 | N30 E50 | 140 | 700 | 3.0 | | | | | | | | | |
| 77 | 6 | 27 | 14825 | N30 E36 | 140 | 700 | 2.5 | | | | | | | | | |
| 77 | 6 | 28 | 14825 | N29 E22 | 140 | 500 | 2.5 | | | | | | | | | |
| 77 | 6 | 29 | 14825 | N29 E10 | 140 | 500 | 2.0 | | | | | | | | | |
| 77 | 6 | 30 | 14825 | N30 W02 | 139 | 500 | 2.5 | | | | | | | | | |
| 77 | 7 | 01 | 14825 | N30 W15 | | 400 | 2.5 | | | | | | | | | |
| 77 | 7 | 02 | 14825 | N31 W28 | | 300 | 2.0 | | | | | | | | | |
| 77 | 7 | 03 | 14825 | N31 W42 | | 300 | 2.0 | | | | | | | | | |
| 77 | 7 | 04 | 14825 | N31 W54 | | 300 | 2.5 | | | | | | | | | |
| 77 | 7 | 05 | 14825 | N30 W69 | | 300 | 1.0 | | | | | | | | | |
| 77 | 7 | 06 | 14825 | N30 W82 | | 300 | 1.0 | | | | | | | | | |

MCMATH REGION 14832 CMP DATE 30.4

| | | | | CALCIUM PLAGE DATA | | | | SUNSPOT DATA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YR | MO | DA | MC NO. | LAT CMD | L | AREA | INT | MW NO. | LAT CMD | L | MAG. | H | STA | AREA | CNT | CLASS |
| 77 | 7 | 01 | 14832 | N40 W11 | | 300 | 3.0 | 19806 | N39 W12 | | (B ) | 3 | B | 10 | 3 | B |
| 77 | 7 | 02 | 14832 | N40 W24 | | 600 | 3.5 | 19806 | N39 W25 | | (BP) | 4 | B | 30 | 11 | C |
| 77 | 7 | 03 | 14832 | N40 W38 | | 1000 | 4.0 | 19806 | N39 W39 | | (B ) | 4 | B | 90 | 10 | D |
| 77 | 7 | 04 | 14832 | N39 W50 | | 1400 | 4.0 | 19806 | N39 W51 | | (B ) | 4 | B | 230 | 8 | D |
| 77 | 7 | 05 | 14832 | N40 W64 | | 1600 | 3.5 | 19806 | N40 W63 | | (B ) | 4 | B | 210 | 8 | D |
| 77 | 7 | 06 | 14832 | N40 W77 | | 1700 | 3.5 | 19806 | N39 W75 | | (B ) | 3 | B | 150 | 2 | C |
| 77 | 7 | 07 | 14832 | N40 W89 | | 1400 | 3.5 | | | | | | | | | |

Note: No calcium spectroheliograms were secured at the McMath-Hulbert Observatory on June 12, 1977.
No sunspot observations were made at Mt. Wilson on June 29, 1977.

## DAILY CALCIUM PLAGE INDEX

### JUNE 1977

| YR | MO | DAY | INDEX | YR | MO | DAY | INDEX | YR | MO | DAY | INDEX |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 77 | 6 | 1 | 10.4 | 77 | 6 | 11 | 13.1 | 77 | 6 | 21 | 13.2 |
| 77 | 6 | 2 | 9.2 | 77 | 6 | 12 | * | 77 | 6 | 22 | 15.8 |
| 77 | 6 | 3 | 9.8 | 77 | 6 | 13 | 10.4 | 77 | 6 | 23 | 19.1 |
| 77 | 6 | 4 | 11.3 | 77 | 6 | 14 | 8.8 | 77 | 6 | 24 | * |
| 77 | 6 | 5 | 15.8 | 77 | 6 | 15 | 6.8 | 77 | 6 | 25 | 20.5 |
| 77 | 6 | 6 | 17.8 | 77 | 6 | 16 | 5.4 | 77 | 6 | 26 | 21.0 |
| 77 | 6 | 7 | 16.7 | 77 | 6 | 17 | 4.6 | 77 | 6 | 27 | 22.2 |
| 77 | 6 | 8 | 17.1 | 77 | 6 | 18 | 4.3 | 77 | 6 | 28 | 21.2 |
| 77 | 6 | 9 | 15.8 | 77 | 6 | 19 | 6.4 | 77 | 6 | 29 | 19.6 |
| 77 | 6 | 10 | 16.6 | 77 | 6 | 20 | 9.2 | 77 | 6 | 30 | 19.8 |

* NO OBSERVATIONS

# SUDDEN IONOSPHERIC DISTURBANCES

## JUNE 1977

| DAY | UNIVERSAL TIME START | END | MAX | IMP | WIDE SPREAD INDEX | NUMBER OF STATION REPORTS BY TYPE SWF | SCNA | SEA | SPA | LF-SPA | SES | SFD | KNOWN FLARE | McMATH REGION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 02 | 0427 | 0530 | 0433 | 1- | 3 | 1 | | | | | | | 0423 | X-RAY |
| 02 | 0808 | 0840 | 0814 | 1 | 5 | 3 | | 1 | | 2 | 2 | | 0803 | X-RAY |
| 02 | 0825 | 0915 | 0830 | 1- | 1 | | | | 1 | | | | 0830E | 14796 |
| 02 | 1950 | 2050 | 2017 | 1- | 1 | | | | 1 | | | | 1951 | X-RAY |
| 02 | 2336 | 0013 | 2344 | 1- | 1 | | | | 1 | | | | 2339 | 14796 |
| 03 | 0907 | 1002 | 0924 | 1 | 5 | 2 | | 2 | 2 | | 1 | | 0907 | 14794 |
| 03 | 0935 | 1015 | 0940 | 1- | 1 | | | | 1 | | | | 0940E | 14794 |
| 03 | 1008 | 1050 | 1016 | 1- | 1 | 1 | | 1 | 1 | | | | 1004 | 14796 |
| 03 | 1314 | 1345 | 1324 | 1 | 1 | | | | 1 | | 1 | | 1310 | X-RAY |
| 03 | 2111 | 2141 | 2118 | 1- | 1 | | | | 1 | | | | 2109 | X-RAY |
| 13 | 0400 | 0520 | 0424 | 1- | 1 | | | | 1 | | | | 0354 | 14801 |
| 14 | 1305 | 1315 | 1308 | 1- | 1 | | | 1 | | | | | 1305 | 14801 |
| 22 | 2119 | 2150 | 2126 | 1- | 1 | | | | 1 | | | | 2115 | X-RAY |
| 23 | 1826 | 1915 | 1836 | 1 | 5 | 1 | | | 1 | | 9 | | 1825 | 14822 |
| 23 | 2203 | 2243 | 2209 | 1- | 5 | 1 | | | 2 | | 5 | | 2200 | 14822 |
| 23 | 2351 | 0020D | 0000 | 1- | 3 | | | | 1 | | 1 | | 2359E | 14822 |
| 24 | 0022 | 0055 | 0032 | 1- | 1 | | | | 1 | | | | 0020 | X-RAY |
| 24 | 0343 | 0436 | 0346 | 1- | 3 | | | | 1 | | | 1 | 0334 | X-RAY |
| 24 | 0739 | 0815 | 0747 | 1- | 3 | | | | 2 | | 1 | | 0735 | 14822 |
| 24 | 1252 | 1320 | 1300 | 1+ | 1 | | | | 1 | | | | 1250 | 14815 |
| 24 | 2208 | 2236D | 2217 | 1- | 1 | | | | 1 | | | | 2212E | 14822 |
| 24 | 2238 | 0006 | 2304 | 1- | 5 | | | | 2 | 1 | 2 | | 2238 | X-RAY |
| 25 | 0657 | 0742 | 0701 | 1- | 1 | | | | 1 | | | | 0653 | 14822 |
| 25 | 1052 | 1207 | 1100 | 1 | 3 | 3 | | 2 | 2 | | 1 | | 1053 | 14822 |
| 25 | 1426 | 1437D | 1437 | 2+ | 5 | 3 | | 1 | 2 | 1 | 9 | | 1425E | 14822 |
| 25 | 1507E | 1630 | 1507 | 1+ | 5 | 4 | 2 | | 3 | 1 | 8 | | 1458 | 14822 |
| 25 | 1800 | 1835 | 1811 | 1 | 5 | | | | 1 | | 7 | | NF | |
| 25 | 1952 | 2030 | 1958 | 1- | 5 | 1 | | | 2 | | 7 | | 1952 | 14822 |
| 25 | 2040 | 2111 | 2047 | 1- | 5 | | | | 2 | | 7 | | 2038 | 14822 |
| 26 | 1011 | 1126 | 1021 | 2 | 5 | 2 | | 2 | 3 | | 2 | | 1018 | 14822 |
| 26 | 1336 | 1431 | 1344 | 2 | 5 | 5 | | 2 | 3 | | 12 | | 1334 | 14815 |
| 26 | 1428 | 1446D | 1446 | 2+ | 5 | 3 | | 1 | 1 | 1 | 11 | | 1422 | 14815 |
| 26 | 1511 | 1535 | 1519 | 2 | 5 | | | 1 | 1 | | 9 | | 1507 | 14822 |
| 26 | 1547 | 1645 | 1552 | 2+ | 5 | 2 | | | 3 | 1 | 7 | | 1546 | 14822 |
| 26 | 2050 | 2125 | 2059 | 1- | 5 | 2 | | | 2 | | 8 | | 2049 | 14822 |
| 26 | 2125 | 2150D | 2132 | 1- | 1 | | | | 1 | | | | * | |
| 26 | 2145E | 2216D | 2153 | 1- | 1 | | | | 1 | | | | 2150 | X-RAY |
| 26 | 2215 | 2300 | 2219 | 1+ | 5 | 3 | 1 | | 4 | | 11 | | 2215 | 14822 |
| 27 | 0016E | 0118 | 0016 | 1- | 1 | | | | 1 | | | | 0017 | X-RAY |
| 27 | 0126 | 0314 | 0150 | 1+ | 5 | | | 1 | 2 | | 2 | | 0127 | 14822 |
| 27 | 0417 | 0512 | 0422 | 1- | 5 | | | 1 | 2 | | 2 | | 0418 | 14815 |
| 27 | 0528 | 0610 | 0536 | 1 | 5 | 4 | | 2 | 4 | | 3 | | 0525 | 14815 |
| 27 | 1501 | 1514 | 1+ | 1 | | | | | 1 | | 1 | | 1505 | 14822 |
| 27 | 1540 | 1640 | 1546 | 1+ | 5 | 3 | | 2 | 3 | | 10 | | 1541 | 14822 |
| 27 | 1834 | 1930 | | 1 | 1 | 1 | | | | | | | 1832 | X-RAY |
| 27 | 1851 | 1920 | 1856 | 1 | 1 | | | | 1 | | 1 | | 1851 | 14822 |
| 27 | 2351 | 0120 | 0016 | 1- | 3 | | | | 1 | | 2 | | 2356 | 14813 |
| 28 | 0010 | 0040 | 0013 | 1- | 5 | 1 | | 1 | 1 | | 3 | | 0003E | 14822 |
| 28 | 0229 | 0304 | 0244 | 1- | 1 | | | | 1 | | | | 0238E | 14822 |

PERIODS OF NO OBSERVATIONS:

| DATE | TIME (UT) and STATION |
|---|---|
| 01-30 | 0000-2400 A36 |
| 01-08 | 0000-2400 A-4 |
| 01 | 1938-2100 UM (10 kHz) |
| 02 | 0154-0250 UM (10 kHz), 1930-2050 UM (10 kHz) |
| 03 | 1930-2100 UM (10 kHz) |
| 04 | 1930-2110 UM (10 kHz) |
| 05 | 0155-0305 UM (10 kHz), 1934-2123 UM (10 kHz), 2225-2400 UM (10 kHz) |
| 06 | 0000-0200 UM (10 kHz), 1247-1645 UM (10 kHz) |
| 07 | 0000-2400 TN, 1930-2100 UM (10 kHz), 1936-2154 TM |
| 08 | 1935-2056 UM (10 kHz) |
| 11 | 0000-1300 MC |
| 13 | 2000-2100 MC |
| 14 | 1656-1700 TM |
| 15 | 1710-1815 UM (13 kHz) |
| 19 | 0514-1042 TM |
| 20 | 1912-1938 TM |
| 21 | 1530-2323 Um (13 kHz) |
| 22 | 1307-2400 UM (13 kHz), 0000-1210 UM (13 kHz), 0000-0050 TM |
| 27 | 2029-2143 TM |

# SUDDEN IONOSPHERIC DISTURBANCES

## JUNE 1977

STATIONS REPORTING FOR JUNE 1977

AAVSO (A1, A4, A21, A3o, A31, A34,
A35, A36, A37, A40) (SES)
(A1, A26, A31) (SEA) (A31) (SWF)
HAWAII (HA) (SFD)
HERSTMONCEUX (HC) (SEA)
HIRAISO (HI) (SWF)
HOBART (TA) (SEA, SES)
HUANCAYO (HU) (SWF)
INUBO (IN) (SPA)
KUHLUNGSBORN (KU) (SWF, SEA, SPA)
MANILA (MA) (SPA)
MCMATH (MC) (SWF, SCNA)
NEW JERSEY (NJ) (SES)
PANSKA VES (PU) (SWF, SEA, SES)
PRESTON (LO) (SEA)
SAO PAULO (UM) (SES, SPA)
SOFIA (SF) (SES)
ST CLOUD (SC) (SES)
TABLE MOUNTAIN (TM) (SPA, LF-SPA)
TORINO (TN) (SPA)

NOTE: NJ is a new station reporting for the first time from Trenton, New Jersey

## SID's BY McMATH REGION

### JUNE 1977

| DAY | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| REGION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94 | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96 | | 2 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 01 | | | | | | | | | | | | | 1 | 1 | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | | | 1 | | 2 | 2 | | | |
| 22 | | | | | | | | | | | | | | | | | | | | | | | 3 | 3 | 5 | 5 | 4 | 2 | | |
| X-RAY | | | 3 | 2 | | | | | | | | | | | | | | | | | | 1 | | 3 | | 1 | 2 | | | |
| UNKNOWN | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | |
| NO FP | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | | |

# SOLAR RADIO EMISSION
# SPECTRAL OBSERVATIONS

JUNE 1977

| | TIMES OF OBSERVATION | | STATION | EVENTS | | | | | | | | | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DECIMETRIC BAND | | | METRIC BAND | | | DEKAMETRIC BAND | | | |
| | START UT | END UT | | START UT | END UT | INT | START UT | END UT | INT | START UT | END UT | INT | |
| 01 | 0000 | 1000 | MANI | | | | | | | | | | |
| | 0426 | 1830 | DURN | | | | | | | | | | |
| | 0905 | 1422 | OWIN | | | | 0905 | 1422 | 1 | | | | IN |
| | 0913 | 2420 | SGMR | | | | | | | | | | |
| | 1230 | 2245 | HARV | | | | | | | | | | |
| | 2129 | 2400 | MANI | | | | | | | | | | |
| 02 | 0425 | 1830 | DURN | | | | | | | | | | |
| | 0738 | 1222 | OWIN | | | | 0738 | 1222 | 1 | | | | IS |
| | | | OWIN | | | | 0808.5 | 0810.8 | 2 | | | | IIIG |
| | 0000 | 1000 | MANI | | | | | | | 0810.2 | 0810.5 | 2 | III |
| | 0913 | 2410 | SGMR | | | | | | | | | | |
| | 1230 | 2245 | HARV | | | | | | | | | | |
| | 2129 | 2400 | MANI | | | | | | | | | | |
| 03 | 0000 | 1000 | MANI | | | | | | | | | | |
| | 0512 | 1831 | DURN | | | | | | | | | | |
| | 0912 | 2411 | SGMR | | | | | | | | | | |
| | 1230 | 2245 | HARV | | | | | | | | | | |
| | 2235 | 2400 | MANI | | | | | | | | | | |
| 04 | 0000 | 1000 | MANI | | | | | | | 0015.8 | 0016.1 | 2 | III |
| | | | MANI | | | | | | | 0044.5 | 0047.6 | 1 | IIIG |
| | 0425 | 1830 | DURN | | | | | | | | | | |
| | 0912 | 2412 | SGMR | | | | | | | | | | |
| | 1230 | 2245 | HARV | | | | | | | | | | |
| | 2129 | 2400 | MANI | | | | | | | | | | |
| 05 | 0000 | 1000 | MANI | | | | | | | | | | |
| | 0425 | 1830 | DURN | | | | | | | | | | |
| | 0911 | 2413 | SGMR | | | | | | | | | | |
| | 1230 | 2245 | HARV | | | | 1828 | | 1 | | | | IIIB |
| | | | HARV | | | | 1834 | | 1 | | | | IIIB |
| | | | HARV | | | | 1857 | | 2 | 1857 | | 2 | IIIG |
| | | | HARV | | | | 1938 | | 1 | 1938 | | 1 | IIIG |
| | | | HARV | | | | 2049 | 2050 | 2 | 2049 | 2050 | 2 | IIIG |
| | | | HARV | | | | 2106 | | 1 | 2106 | | 1 | IIIB |
| | 2129 | 2400 | MANI | | | | | | | | | | |
| 06 | 0000 | 1000 | MANI | | | | | | | 0305.2 | 0305.7 | 2 | III |
| | 0425 | 1831 | DURN | | | | | | | | | | |
| | 0911 | 2413 | SGMR | | | | | | | 1150.0 | 2413.0 | 1 | CONT |
| | 1225 | 1452 | OWIN | | | | 1225 | 1452 | 1 | | | | IS |
| | | | SGMR | | | | | | | 1426.9 | 1532.9 | 1 | IIIS |
| | 1230 | 2245 | HARV | | | | 1525 | 1527 | 1 | 1525 | 1527 | 1 | IIIG,RS,DP |
| | | | HARV | | | | 1534 | | 1 | 1534 | | 1 | IIIB |
| | | | HARV | | | | 1548 | | 2 | 1548 | | 2 | IIIB |
| | | | HARV | | | | 1602 | 2005 | 1 | 1602 | 2005 | 1 | IIIN |
| | 2129 | 2400 | MANI | | | | | | | | | | |
| | | | HARV | | | | 2153 | | 1 | 2153 | | 1 | IIIB |
| | | | HARV | | | | 2159 | | 1 | 2159 | | 1 | IIIB |
| 07 | 0000 | 0638 | MANI | | | | | | | 0421.1 | 0421.3 | 2 | III |
| | 0450 | 1831 | DURN | | | | | | | | | | |
| | 0700 | 1335 | OWIN | | | | 0700 | 1335 | 1 | | | | IS |
| | 0715 | 1000 | MANI | | | | | | | | | | |
| | 0911 | 2414 | SGMR | | | | | | | 0911.0 | 2414.0 | 1 | CONT |
| | | | SGMR | | | | | | | 1128.1 | 1132.2 | 1 | IIIG |
| | 1230 | 2245 | HARV | | | | 1241 | 2245 | 1 | | | | IN |
| | | | HARV | | | | 1527 | 2207 | 2 | 1527 | 2207 | 2 | IIIS |
| | 2129 | 2400 | MANI | | | | | | | | | | |
| 08 | 0000 | 0958 | MANI | | | | | | | | | | |
| | 0425 | 1830 | DURN | | | | | | | | | | |
| | 0915 | 1350 | OWIN | | | | 0915 | 1350 | 1 | | | | IS |
| | 0911 | 2414 | SGMR | | | | | | | 1300.0 | 2414.0 | 1 | CONT |
| | | | HARV | | | | 1357 | 2245 | 1 | | | | IN |
| | 1230 | 2245 | HARV | | | | 1547 | | 1 | 1547 | | 1 | IIIG |
| | | | HARV | | | | 1606 | 2101 | 1 | 1606 | 2101 | 1 | IIIN |
| | 2129 | 2400 | MANI | | | | | | | | | | |

# SOLAR RADIO EMISSION
# SPECTRAL OBSERVATIONS

JUNE 1977

| | TIMES OF OBSERVATION | | STATION | EVENTS | | | | | | | | | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DECIMETRIC BAND | | | METRIC BAND | | | DEKAMETRIC BAND | | | |
| | START UT | END UT | | START UT | END UT | INT | START UT | END UT | INT | START UT | END UT | INT | |
| 09 | 0000 | 0958 | MANI | | | | | | | | | | |
| | 0425 | 1831 | DURN | | | | | | | | | | |
| | 0755 | 1046 | DWIN | | | | 0755 | 1046 | 1 | | | | IS |
| | 1126 | 1408 | DWIN | | | | 1126 | 1408 | 1 | | | | IC |
| | 1230 | 2245 | HARV | | | | 1232 | 1238 | 2 | 1232 | 1238 | 2 | IIIGG |
| | 0910 | 2415 | SGMR | | | | | | | 1233.6 | 1237.2 | 2 | V |
| | | | SGMR | | | | | | | 1237.2 | 1304.0 | 1 | CONT |
| | | | HARV | | | | 1242 | | 1 | | | | IIIB |
| | | | SGMR | | | | | | | 1824.9 | 1829.0 | 3 | V |
| | | | HARV | | | | 1825 | 1830 | 3 | 1825 | 1830 | 3 | IIIGG,V |
| | | | HARV | | | | 1832 | 1839 | 2 | 1832 | 1839 | 1 | IIIGG |
| | | | SGMR | | | | | | | 2029.2 | 2030.8 | 1 | IIIG |
| | | | HARV | | | | 2029 | 2030 | 2 | 2029 | 2030 | 2 | IIIG |
| | | | HARV | | | | 2033 | 2034 | 1 | 2033 | 2034 | 1 | IIIG |
| | 2129 | 2400 | MANI | | | | | | | | | | |
| 10 | 0000 | 0956 | MANI | | | | | | | 0345.7 | 0353.2 | 3 | IIIG |
| | 0425 | 0500 | DURN | | | | | | | | | | |
| | 0510 | 1831 | DURN | | | | | | | | | | |
| | 0725 | 1402 | DWIN | | | | 0725 | 1402 | 1 | | | | IN |
| | 1230 | 2245 | HARV | | | | 1448 | 1500 | 1 | 1448 | 1500 | 1 | IIIG |
| | 0910 | 2416 | SGMR | | | | | | | 1457.9 | 1500.6 | 1 | IIIG |
| | 2129 | 2400 | MANI | | | | | | | | | | |
| | | | SGMR | | | | | | | 2133.8 | 2134.1 | 1 | III |
| 11 | 0000 | 0641 | MANI | | | | | | | | | | |
| | 0425 | 1830 | DURN | | | | | | | | | | |
| | 0647 | 0956 | MANI | | | | | | | | | | |
| | 0910 | 2416 | SGMR | | | | | | | | | | |
| | 1230 | 2245 | HARV | | | | 1308 | 1313 | 1 | | | | I |
| | 2130 | 2400 | MANI | | | | | | | | | | |
| 12 | 0000 | 0956 | MANI | | | | | | | | | | |
| | 0425 | 1830 | DURN | 0742.1 | 0742.2 | 3 | | | | | | | IIIG |
| | 0910 | 2417 | SGMR | | | | | | | | | | |
| | 1230 | 2245 | HARV | | | | | | | | | | |
| | 2130 | 2400 | MANI | | | | | | | | | | |
| 13 | 0000 | 0956 | MANI | | | | | | | | | | |
| | 0425 | 1830 | DURN | | | | | | | | | | |
| | 0910 | 2417 | SGMR | | | | | | | | | | |
| | 1230 | 2245 | HARV | | | | | | | | | | |
| | 2131 | 2400 | MANI | | | | | | | | | | |
| 14 | 0000 | 0956 | MANI | | | | | | | | | | |
| | 0620 | 1831 | DURN | | | | | | | | | | |
| | 0910 | 2417 | SGMR | | | | | | | | | | |
| | 1230 | 2245 | HARV | | | | | | | | | | |
| | 2131 | 2400 | MANI | | | | | | | | | | |
| 15 | 0000 | 0044 | MANI | | | | | | | | | | |
| | 0150 | 0956 | MANI | | | | | | | 0410.9 | 0411.6 | 1 | III |
| | 0425 | 1830 | DURN | | | | | | | | | | |
| | 0910 | 2417 | SGMR | | | | | | | | | | |
| | 1215 | 2245 | HARV | | | | | | | | | | |
| | 2131 | 2400 | MANI | | | | | | | | | | |
| 16 | 0000 | 0956 | MANI | | | | | | | | | | |
| | 0425 | 1831 | DURN | | | | | | | | | | |
| | 0910 | 2418 | SGMR | | | | | | | | | | |
| | 1022 | 1447 | DWIN | | | | | | | | | | |
| | 1215 | 2245 | HARV | | | | | | | | | | |
| | 2131 | 2400 | MANI | | | | | | | | | | |
| 17 | 0000 | 0956 | MANI | | | | | | | | | | |
| | 0713 | 1227 | DWIN | | | | | | | | | | |
| | 0910 | 2419 | SGMR | | | | | | | | | | |
| | 0425 | 1831 | DURN | 1045 | 1046.2 | 3 | | | | | | | DCIM |
| | 1215 | 2245 | HARV | | | | | | | | | | |
| | 2131 | 2400 | MANI | | | | | | | | | | |

# SOLAR RADIO EMISSION
# SPECTRAL OBSERVATIONS

JUNE 1977

| | TIMES OF OBSERVATION | | STATION | EVENTS | | | | | | | | | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DECIMETRIC BAND | | | METRIC BAND | | | DEKAMETRIC BAND | | | |
| | START UT | END UT | | START UT | END UT | INT | START UT | END UT | INT | START UT | END UT | INT | |
| 18 | 0000 | 0105 | MANI | | | | | | | | | | |
| | 0120 | 0956 | MANI | | | | | | | | | | |
| | 0425 | 0450 | DURN | | | | | | | | | | |
| | 0910 | 2419 | SGMR | | | | | | | | | | |
| | 1248 | 1831 | DURN | | | | | | | | | | |
| | 1500 | 2245 | HARV | | | | | | | | | | |
| | 2131 | 2400 | MANI | | | | | | | | | | |
| 19 | 0000 | 0956 | MANI | | | | | | | | | | |
| | 0425 | 1831 | DURN | | | | | | | | | | |
| | 0910 | 2419 | SGMR | | | | | | | | | | |
| | 1215 | 2245 | HARV | | | | | | | | | | |
| | 2131 | 2400 | MANI | | | | | | | | | | |
| 20 | 0000 | 0956 | MANI | | | | | | | | | | |
| | 0425 | 1831 | DURN | | | | | | | | | | |
| | 0910 | 2419 | SGMR | | | | | | | | | | |
| | 1215 | 2245 | HARV | | | | | | | | | | |
| | 2132 | 2400 | MANI | | | | | | | | | | |
| 21 | 0000 | 0956 | MANI | | | | | | | | | | |
| | 0425 | 1831 | DURN | | | | | | | | | | |
| | 0735 | 0805 | DWIN | | | | 0735 | 0805 | 1 | | | | IN |
| | 0910 | 2421 | SGMR | | | | | | | | | | |
| | 0935 | 1425 | DWIN | | | | 0935 | 1425 | 1 | | | | IN |
| | 1215 | 2245 | HARV | | | | | | | | | | |
| | 2132 | 2400 | MANI | | | | | | | | | | |
| 22 | 0000 | 0959 | MANI | | | | | | | | | | |
| | 0425 | 0454 | DURN | | | | | | | | | | |
| | 0503 | 1831 | DURN | | | | | | | | | | |
| | 0911 | 2420 | SGMR | | | | | | | | | | |
| | 1151 | 1412 | DWIN | | | | 1151 | 1412 | 1 | | | | IN |
| | 1215 | 2245 | HARV | | | | | | | | | | |
| | 2132 | 2400 | MANI | | | | | | | | | | |
| 23 | 0000 | 0959 | MANI | | | | | | | | | | |
| | 0425 | 1831 | DURN | | | | | | | | | | |
| | 1215 | 1340 | HARV | | | | | | | | | | |
| | 1500 | 2245 | HARV | | | | 1723 | | 2 | | | | IIIG |
| | 0911 | 2420 | SGMR | | | | | | | 1830.7 | 1831.0 | 1 | IIIG |
| | | | HARV | | | | 1831 | | 3 | 1831 | | 3 | IIIB |
| | | | HARV | | | | 1942 | | 1 | | | | IIIG |
| | | | SGMR | | | | | | | 1957.7 | 1957.9 | 1 | III |
| | | | HARV | | | | 1958 | | 3 | 1958 | | 3 | IIIG |
| | | | SGMR | | | | | | | 2110.7 | 2112.2 | 3 | V |
| | | | HARV | | | | 2110 | 2112 | 3 | 2110 | 2112 | 3 | IIIG,V |
| | 2132 | 2400 | MANI | | | | | | | | | | |
| | | | SGMR | | | | | | | 2140.2 | 2140.9 | 1 | III |
| | | | HARV | | | | 2140 | 2141 | 3 | 2140 | 2141 | 3 | IIIG |
| | | | HARV | | | | 2240 | 2244 | 2 | 2240 | 2244 | 2 | IIIG |
| 24 | 0000 | 0959 | MANI | | | | | | | | | | |
| | 0425 | 1831 | DURN | 0707.0 | 0718.0 | 3 | | | | | | | DCIM |
| | | | DURN | 0741.0 | 0744.6 | 3 | | | | | | | DCIM |
| | | | DURN | 0816.0 | 0831.0 | 3 | | | | | | | DCIM |
| | | | DURN | 0835.8 | 1910.0 | 3 | | | | | | | DCIM,N |
| | 0911 | 2420 | SGMR | | | | | | | | | | |
| | 1215 | 2245 | HARV | | | | | | | | | | |
| | | | DURN | 1439.6 | 1441.2 | 3 | | | | | | | DCIM |
| | 2133 | 2400 | MANI | | | | | | | | | | |
| 25 | 0000 | 0604 | MANI | | | | | | | | | | |
| | 0630 | 0959 | MANI | | | | | | | 0702.4 | 0703.3 | 2 | III |
| | 0911 | 2420 | SGMR | | | | | | | | | | |
| | 1215 | 2245 | HARV | | | | 1237 | 1240 | 1 | | | | I |
| | 0425 | 1522 | DURN | 1240.0 | 1240.1 | 3 | | | | | | | III |
| | | | HARV | | | | 1327 | 1505 | 1 | | | | IN |
| | 1544 | 1831 | DURN | | | | | | | | | | |
| | | | HARV | | | | 1647 | | 2 | | | | IIIG |

# SOLAR RADIO EMISSION
# SPECTRAL OBSERVATIONS

JUNE 1977

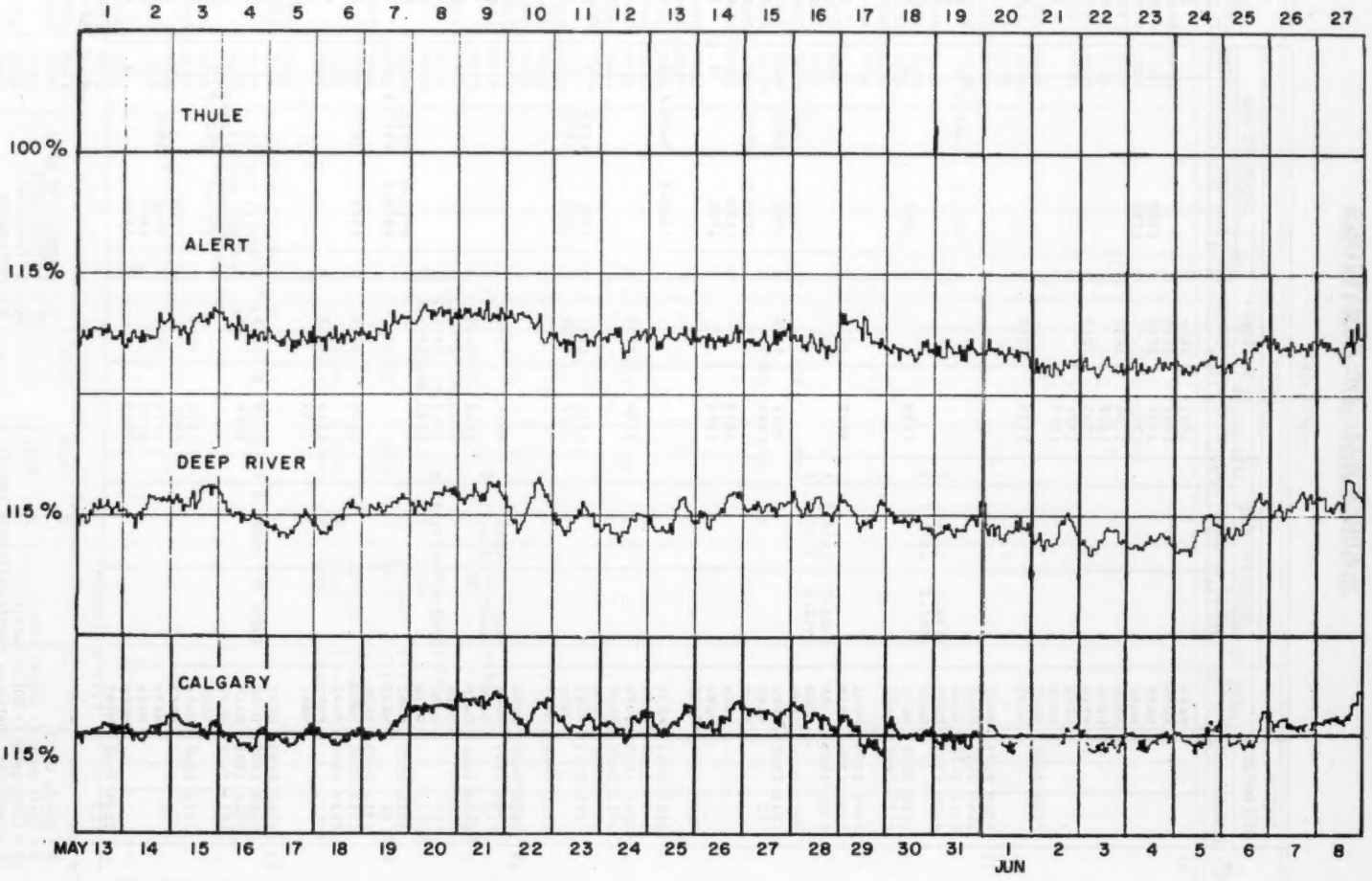
| JUN 1977 | TIMES OF OBSERVATION START UT | TIMES OF OBSERVATION END UT | STATION | EVENTS: DECIMETRIC BAND START UT | DECIMETRIC BAND END UT | DECIMETRIC BAND INT | METRIC BAND START UT | METRIC BAND END UT | METRIC BAND INT | DEKAMETRIC BAND START UT | DEKAMETRIC BAND END UT | DEKAMETRIC BAND INT | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | | | HARV | | | | 1651 | 1654 | 2 | | | | IIIGG |
| | | | HARV | | | | 1657 | 1659 | 1 | | | | IIIG |
| | | | HARV | | | | 1707 | 1708 | 2 | 1708 | | 1 | IIIG |
| | | | HARV | | | | 1752 | | 2 | 1752 | | 2 | IIIB |
| | | | HARV | | | | 1756 | 1757 | 2 | | | | IIIG |
| | | | HARV | | | | 1822 | | 2 | | | | IIIG |
| | | | HARV | | | | 1845 | 2245 | 1 | | | | IN |
| | | | HARV | | | | 1904 | | 2 | | | | IIIG |
| | | | HARV | | | | 1919 | | 1 | | | | IIIG |
| | 2133 | 2400 | MANI | | | | | | | | | | |
| | | | HARV | | | | 2235 | 2243 | 1 | | | | IIIGG |
| 26 | 0000 | 0539 | MANI | | | | | | | | | | |
| | 0545 | 0959 | MANI | | | | | | | | | | |
| | 0912 | 2420 | SGMR | | | | | | | 1436.6 | 1440.0 | 1 | V |
| | 0428 | 1831 | DURN | 1438.3 | 1438.4 | 3 | | | | | | | IIIG |
| | | | DURN | 1547.3 | 1549.7 | 3 | | | | | | | DCIM |
| | 1500 | 2245 | HARV | | | | 1803 | | 1 | 1803 | | 1 | IIIB |
| | 2133 | 2400 | MANI | | | | | | | | | | |
| 27 | 0000 | 0959 | MANI | | | | | | | | | | |
| | 0850 | 1356 | DWIN | | | | 0850 | 1356 | 1 | | | | IS |
| | 0429 | 1831 | DURN | 1438.2 | 1438.7 | 3 | | | | | | | IIIG |
| | | | DURN | 1452.0 | 1452.3 | 3 | | | | | | | IIIG |
| | 0912 | 2420 | SGMR | | | | | | | 1452.0 | 1453.2 | 2 | V |
| | 1215 | 2245 | HARV | | | | 1452 | 1453 | 3 | 1452 | 1453 | 3 | IIIG,V |
| | | | HARV | | | | 1504 | | 2 | | | | IIIB |
| | | | SGMR | | | | | | | 1633.3 | 1633.6 | 2 | III |
| | | | HARV | | | | 1633 | | 3 | 1633 | | 3 | IIIB,V |
| | | | HARV | | | | 1708 | | 1 | 1708 | | 1 | IIIB |
| | 2133 | 2400 | MANI | | | | | | | | | | |
| 28 | 0000 | 0959 | MANI | | | | | | | 0425.0 | 0425.2 | 2 | III |
| | 0430 | 1106 | DURN | | | | | | | | | | |
| | 0744 | 1158 | DWIN | | | | 0744 | 1158 | 1 | | | | IS |
| | 0913 | 2420 | SGMR | | | | | | | | | | |
| | 1224 | 1831 | DURN | | | | | | | | | | |
| | 1215 | 2245 | HARV | | | | 1731 | 1732 | 1 | 1731 | 1732 | 1 | IIIG |
| | | | HARV | | | | 1757 | 1758 | 2 | 1757 | 1758 | 2 | IIIG |
| | 2200 | 2400 | MANI | | | | | | | | | | |
| 29 | 0430 | 0456 | DURN | | | | | | | | | | |
| | 0504 | 1830 | DURN | 0627 | 1830 | | 0627 | 1830 | | | | | I,DC,W,N |
| | | | DURN | 0644 | 0644.1 | 2 | | | | | | | III |
| | 0748 | 1401 | DWIN | | | | 0748 | 1401 | 1 | | | | IS,W |
| | | | DWIN | | | | 0750.7 | 0750.8 | 1 | | | | IIIG |
| | | | DURN | 0753.6 | 0754.2 | 1 | 0753.7 | 0754.2 | 1 | | | | IIIG |
| | | | DWIN | | | | 0753.8 | 0754.4 | 1 | | | | IIIG |
| | 0000 | 0959 | MANI | | | | | | | 0812.6 | 0813.0 | 2 | III |
| | | | MANI | | | | | | | 0826.7 | 0827.0 | 1 | III |
| | 0913 | 2420 | SGMR | | | | | | | | | | |
| | 1215 | 2245 | HARV | | | | 1435 | 1829 | 2 | 1435 | 1829 | 2 | IIIN |
| | 2134 | 2400 | MANI | | | | | | | | | | |
| | | | HARV | | | | 2211 | 2213 | 1 | | | | I |
| | | | HARV | | | | 2233 | | 1 | | | | I |
| 30 | 0000 | 0959 | MANI | | | | | | | | | | |
| | 0429 | 1830 | DURN | 0429 E | 1830 D | 2 | 0429 E | 1830 D | 2 | | | | IC,DC,N |
| | 0946 | 1328 | DWIN | | | | 0946 | 1328 | 1 | | | | IC |
| | 0913 | 2420 | SGMR | | | | | | | 1223.9 | 1224.1 | 1 | III |
| | | | SGMR | | | | | | | 1315.3 | 2420.0 | 1 | CONT |
| | 1215 | 2245 | HARV | | | | 1506 | 1618 | 1 | | | | INW |
| | | | HARV | | | | 1556 | | 3 | 1556 | | 3 | IIIB |
| | | | HARV | | | | 1624 | 1626 | 2 | 1624 | 1626 | 2 | IIIB |
| | | | HARV | | | | 1657 | | 1 | 1657 | | 1 | IIIB |
| | | | HARV | | | | 1709 | | 2 | 1709 | | 2 | IIIB |
| | 2134 | 2400 | MANI | | | | | | | | | | |

The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of bursts
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III
RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity

# COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1966 (May - June 1977)

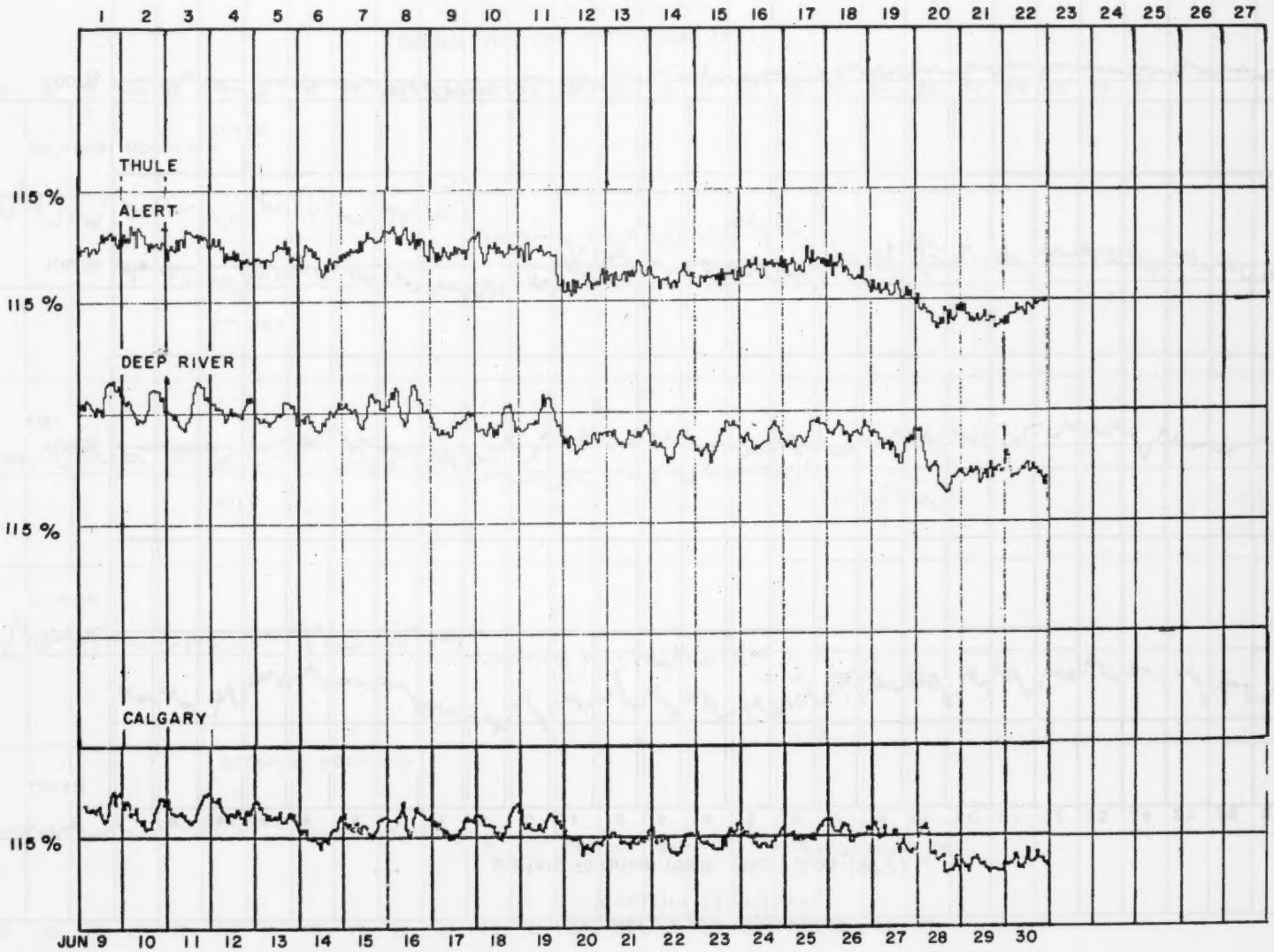



# COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1967 (June 1977)

COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1967 (June 1977)

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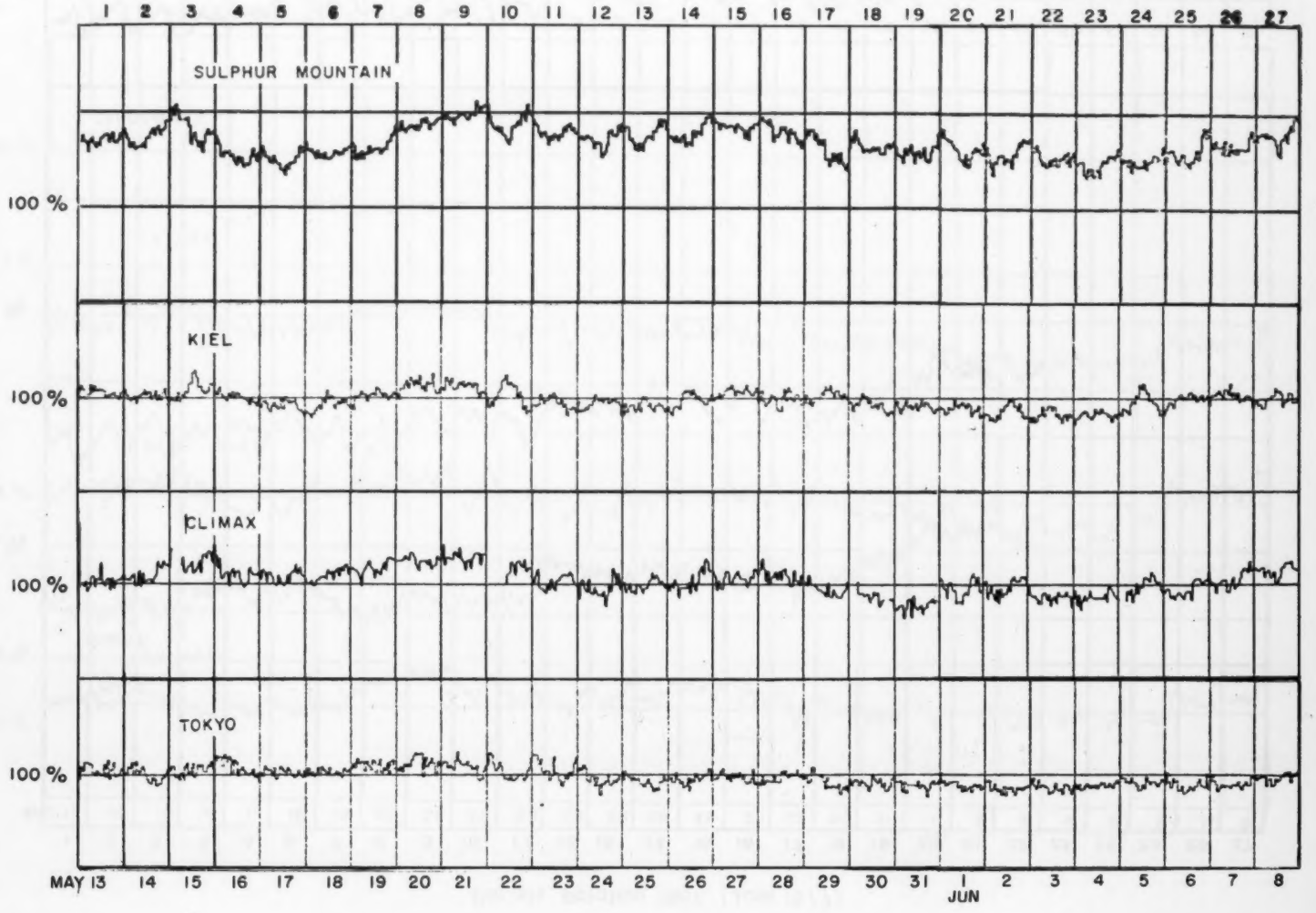
Jun 77

# COSMIC RAY INDICES
(Neutron Monitors)

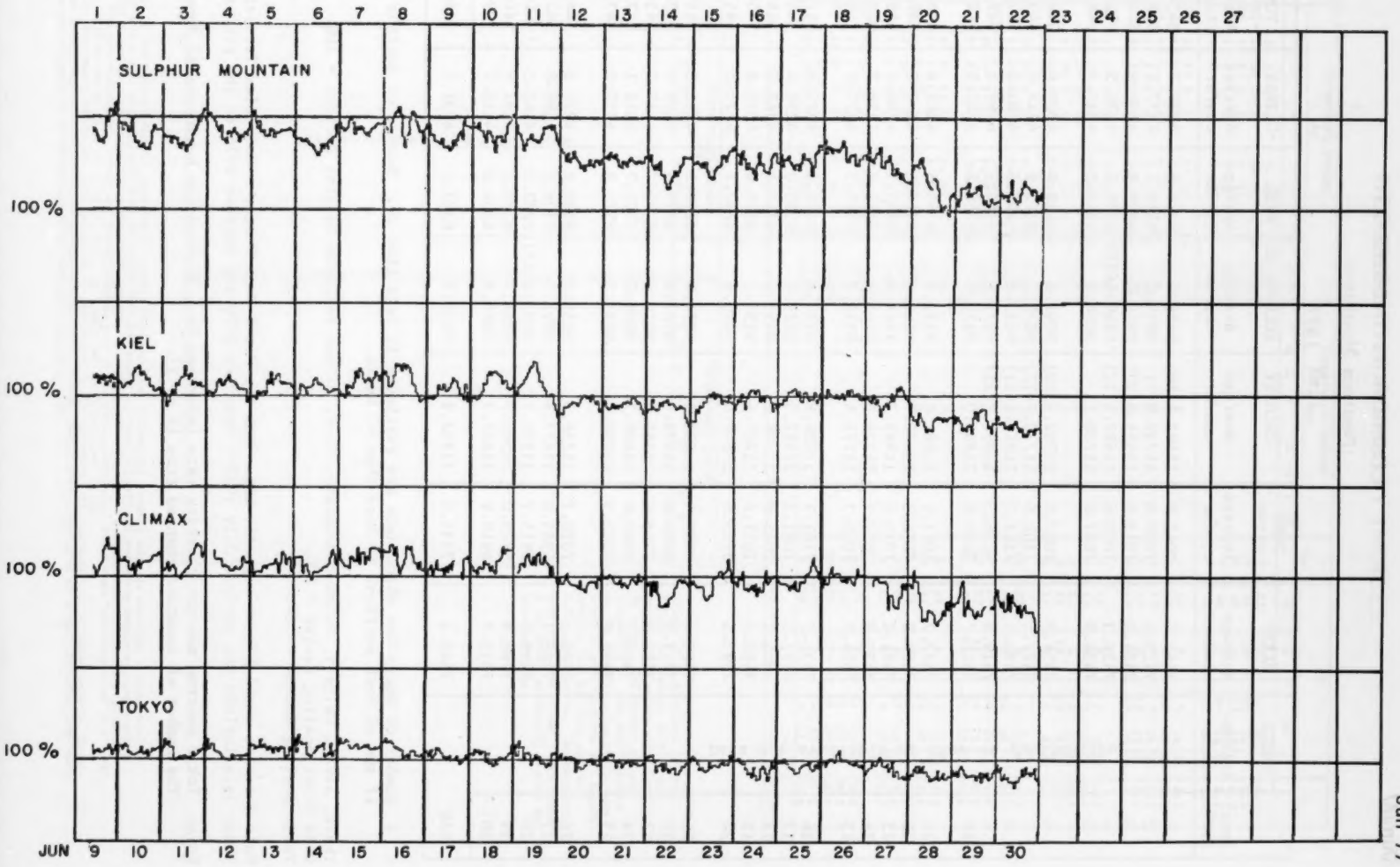
Bartels Rotation 1966 (May-June 1977)




COSMIC RAY INDICES

# COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1967 (June 1977)

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Jun 77

# COSMIC RAY INDICES

## (Neutron Monitors)

### JUNE 1977

| June 1977 | THULE Average cts/hr | ALERT Average cts/hr | DEEP RIVER Average cts/hr | CALGARY Average cts/hr | SULPHUR MT Average cts/hr | KIEL Average cts/hr | CLIMAX Average cts/hr | TOKYO Average cts/hr | KULA Average cts/hr |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Data not available at time of publication | 7462.7 | 7042.0 | 11693.4(18) | 9056.5 | 6326.6 | 4224.2 | 5454.6 | 1213.0 |
| 2 | | 7425.4 | 7029.8 | 11739.8(7) | 9038.0 | 6316.7 | 4227.1 | 5445.4 | 1215.2 |
| 3 | | 7424.0 | 7013.0 | 11656.4(22) | 9015.7 | 6305.6 | 4206.6 | 5448.1 | 1213.5 |
| 4 | | 7426.3 | 7008.6 | 11682.4(22) | 8989.6(23) | 6305.0 | 4206.5 | 5453.4 | 1214.0 |
| 5 | | 7430.9 | 7027.0 | 11700.1 | 9004.0 | 6347.5 | 4227.7 | 5461.8 | 1211.3 |
| 6 | | 7454.7 | 7067.0 | 11702.4(22) | 9047.6 | 6358.4 | 4220.8 | 5454.6 | -- |
| 7 | | 7479.1 | 7101.6 | 11770.7(22) | 9079.2 | 6372.3 | 4244.0 | 5458.0 | -- |
| 8 | | 7486.0 | 7121.7 | 11816.1(21) | 9133.2 | 6361.5 | 4263.2 | 5477.9 | -- |
| 9 | | 7519.8 | 7116.3 | 11898.9(21) | 9177.4 | 6364.3 | 4269.2 | 5477.8 | 1217.7 |
| 10 | | 7531.7 | 7099.0 | 11865.0 | 9138.6 | 6368.2 | 4265.8 | 5472.6 | 1220.4 |
| 11 | | 7527.7 | 7091.1 | 11881.4 | 9137.8 | 6354.5 | 4262.8 | 5468.8 | 1216.2 |
| 12 | | 7488.0 | 7086.3 | 11879.7 | 9160.6 | 6347.1 | 4264.2 | 5464.2 | 1213.4 |
| 13 | | 7484.2 | 7070.0 | 11842.7 | 9164.4 | 6350.5 | 4258.8 | 5481.8 | 1217.1(23) |
| 14 | | 7470.8 | 7057.7 | 11724.4 | 9101.0 | 6343.8 | 4258.3 | 5480.6 | 1211.9 |
| 15 | | 7514.7 | 7085.7 | 11777.4 | 9174.1 | 6365.3 | 4277.9 | 5488.9 | 1221.4 |
| 16 | | 7531.7 | 7101.1 | 11824.8 | 9183.4 | 6374.4 | 4275.6 | 5477.6 | 1220.4 |
| 17 | | 7497.1 | 7041.2 | 11767.3 | 9127.0 | 6335.0 | 4252.4 | 5459.3 | 1217.4 |
| 18 | | 7501.7 | 7043.9 | 11799.2 | 9155.4 | 6357.1 | 4263.5 | 5458.8 | 1217.0 |
| 19 | | 7480.6 | 7059.8 | 11787.9 | 9135.2 | 6353.6 | 4261.5 | 5458.3 | 1215.6 |
| 20 | | 7395.5 | 6995.6 | 11672.0 | 9020.6 | 6290.7 | 4215.5 | 5443.4 | 1218.9(23) |
| 21 | | 7425.4 | 7009.9 | 11690.0 | 9021.7 | 6286.8 | 4222.8 | 5442.6 | 1212.9 |
| 22 | | 7412.6 | 6985.0 | 11673.6 | 8981.6 | 6276.5 | 4199.2 | 5431.5 | 1209.8 |
| 23 | | 7413.3 | 6998.3 | 11685.4 | 9010.6 | 6295.7 | 4217.2 | 5436.0 | 1210.9 |
| 24 | | 7446.2 | 7002.4 | 11689.2 | 9009.0 | 6308.7 | 4214.1 | 5423.4 | 1213.8 |
| 25 | | 7456.0 | 7012.3 | 11720.4 | 9027.2 | 6314.8 | 4222.3 | 5431.1 | 1215.7 |
| 26 | | 7430.3 | 7020.7 | 11736.4 | 9058.0 | 6320.8 | 4227.8 | 5443.6 | 1215.3 |
| 27 | | 7369.7 | 6983.8 | 11677.6 | 8992.0 | 6306.1 | 4199.0 | 5422.2 | 1207.3(23) |
| 28 | | 7299.8 | 6915.7 | 11586.1 | 8903.6(23) | 6232.0 | 4163.3 | 5404.0 | 1202.0 |
| 29 | | 7288.8 | 6905.0 | 11508.7 | 8854.7 | 6228.1 | 4161.9 | 5404.5 | 1204.9 |
| 30 | | 7315.7 | 6910.9 | 11537.2 | 8866.8 | 6204.8 | 4158.7 | 5399.8 | 1203.5 |
| MEAN | | 7446.3 | 7033.4 | 11732.9 | 9058.8 | 6322.4 | 4231.1 | 5450.8 | 1213.7 |

( ) Number of hours for which data are available if less than 24. Number of Section Hours at Climax if sum of both sections is less than 40 hours.

Thule, Alert, Calgary, Sulphur Mountain, Kiel, Climax and Kula Scaling Factors = 100.
Deep River Scaling Factor = 300.
Tokyo Scaling Factor = 128.

* Kula data are available on magnetic tape from the World Data Center A for Solar-Terrestrial Physics. These data include the periods July 1967 - December 1970 and October 1975 to the present.

Note: Tokyo neutron monitor counting rate increased by 1.5 since the beginning of June 1977. The number of counters changed from 18 to 27.

# GEOMAGNETIC ACTIVITY INDICES

JUNE 1977

| Day | | Three-Hourly Indices Kp | | | | | | | | | Three-Hourly Indices Km | | | | | | | | Ap | aa * | | | | | Cp |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Sum | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | N | S | M | | | |
| 1 | | 2+ | 2 | 1+ | 1 | 2- | 2+ | 3+ | 3 | 17 | | | | | | | | | 9 | 22 | 13 | 13 | 23 | | 0.5 |
| 2 | D1* | 4- | 3- | 2+ | 2 | 3- | 3 | 2- | 4+ | 22+ | | | | | | | | | 14 | 30 | 19 | 20 | 31 | | 0.8 |
| 3 | Q0 | 2- | 2 | 2 | 1+ | 2 | 0+ | 1 | 2 | 12+ | | | | | | | | | 6 | 16 | 8 | 13 | 12 | C | 0.3 |
| 4 | Q6 | 2 | 2 | 1+ | 2 | 2 | 1 | 1- | 1- | 12- | | | | | | | | | 5 | 18 | 6 | 14 | 10 | CC | 0.2 |
| 5 | | 1+ | 2 | 1 | 2+ | 3+ | 2- | 1- | 1 | 13+ | | | | | | | | | 7 | 16 | 14 | 12 | 19 | D | 0.4 |
| 6 | Q5 | 2- | 1+ | 2 | 1 | 1+ | 1- | 1- | 2- | 10+ | | | | | | | | | 5 | 13 | 7 | 9 | 11 | CK | 0.2 |
| 7 | | 1- | 1 | 2- | 2- | 2 | 1 | 3- | 2- | 12+ | | | | | | | | | 6 | 17 | 6 | 10 | 13 | CC | 0.3 |
| 8 | Q7 | 0+ | 1 | 2- | 1+ | 2 | 2 | 2- | 2 | 12 | | | | | | | | | 6 | 18 | 7 | 9 | 16 | CC | 0.2 |
| 9 | Q8 | 1+ | 1 | 2 | 1 | 1 | 1 | 2- | 3- | 12- | | | | | | | | | 6 | 17 | 6 | 10 | 13 | C | 0.3 |
| 10 | | 3 | 3- | 2+ | 2 | 1+ | 1- | 2- | 2- | 15+ | | | | | | | | | 8 | 19 | 7 | 17 | 9 | CC | 0.4 |
| 11 | Q2 | 1- | 2- | 1- | 0+ | 1- | 0+ | 1 | 2 | 7+ | | | | | | | | | 4 | 11 | 5 | 7 | 9 | CC | 0.1 |
| 12 | Q3 | 2 | 1+ | 0+ | 0 | 0+ | 0+ | 2 | 1+ | 8- | | | | | | | | | 4 | 13 | 5 | 9 | 10 | CC | 0.1 |
| 13 | | 1+ | 2- | 1+ | 1- | 1 | 1 | 2 | 3 | 12 | | | | | | | | | 6 | 13 | 4 | 6 | 11 | CK | 0.3 |
| 14 | | 4 | 3- | 2 | 1+ | 1+ | 1- | 2- | 2 | 16- | | | | | | | | | 9 | 21 | 10 | 22 | 9 | K | 0.5 |
| 15 | Q1 | 1- | 1+ | 1- | 0+ | 0+ | 0+ | 1+ | 1+ | 6+ | | | | | | | | | 3 | 13 | 4 | 8 | 9 | CC | 0.1 |
| 16 | | 2- | 1+ | 1 | 1+ | 3 | 4- | 3- | 2 | 17- | | | | | | | | | 10 | 22 | 8 | 8 | 23 | K | 0.5 |
| 17 | | 2 | 3- | 2+ | 1+ | 2+ | 3- | 1+ | 2 | 17- | | | | | | | | | 8 | 22 | 8 | 14 | 16 | | 0.4 |
| 18 | D5* | 1 | 2 | 3+ | 2 | 1+ | 3- | 3 | 3- | 18 | | | | | | | | | 10 | 25 | 15 | 16 | 25 | | 0.6 |
| 19 | | 2+ | 3- | 3- | 2 | 2+ | 3 | 1+ | 2 | 18+ | | | | | | | | | 10 | 23 | 11 | 14 | 21 | | 0.5 |
| 20 | D3* | 4- | 3- | 3 | 2 | 3- | 1+ | 2 | 1+ | 19- | | | | | | | | | 11 | 26 | 14 | 25 | 15 | | 0.6 |
| 21 | | 1- | 2+ | 2+ | 2- | 2+ | 2- | 1+ | 1 | 13+ | | | | | | | | | 6 | 17 | 8 | 13 | 12 | CK | 0.3 |
| 22 | | 2- | 1+ | 1- | 1 | 3 | 3+ | 4 | 2- | 17- | | | | | | | | | 10 | 31 | 11 | 10 | 32 | | 0.6 |
| 23 | D4* | 4 | 3 | 2- | 1+ | 2+ | 2+ | 2- | 1+ | 18- | | | | | | | | | 10 | 25 | 7 | 19 | 14 | | 0.6 |
| 24 | | 2 | 3- | 3- | 1 | 1 | 2- | 2- | 2 | 15- | | | | | | | | | 7 | 20 | 8 | 17 | 11 | K | 0.4 |
| 25 | Q4 | 1+ | 1 | 1 | 1 | 2- | 2 | 1 | 1+ | 10+ | | | | | | | | | 5 | 12 | 8 | 9 | 12 | CC | 0.2 |
| 26 | Q9 | 2- | 2- | 2- | 2 | 2- | 2- | 1- | 2- | 13- | | | | | | | | | 6 | 14 | 8 | 11 | 11 | CC | 0.3 |
| 27 | | 3 | 2 | 2- | 1+ | 2- | 2- | 2 | 1- | 14 | | | | | | | | | 7 | 19 | 8 | 15 | 12 | C | 0.3 |
| 28 | D2* | 2- | 3- | 3 | 3+ | 3 | 3- | 3- | 2+ | 21+ | | | | | | | | | 12 | 28 | 17 | 25 | 20 | | 0.7 |
| 29 | | 3 | 2+ | 2- | 1+ | 1 | 2- | 1 | 2- | 14- | | | | | | | | | 7 | 17 | 9 | 14 | 13 | C | 0.3 |
| 30 | | 2- | 1+ | 1+ | 2- | 2 | 3- | 3+ | 3- | 17- | | | | | | | | | 9 | 20 | 9 | 9 | 21 | | 0.5 |
| | | | | | | | | | | | | | | | | | | | Mean | 8 | 19.2 | 9.6 | 14.3 | | 0.38 |

Data not available at time of publication

| Day | Three-Hourly Indices Kn | | | | | | | | Three-Hourly Indices Ks | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | |

Data not available at time of publication

* Errata: Note that the N and M values of aa published in these tables for January 1974 through January 1977 values were slightly in error. The correct values (resulting in some modifications in the classification of the days C and K) will be given in a supplementary IAGA Bulletin and the Bulletin 32 series. The magnetic tape deposited in World Data Center A for Solar-Terrestrial Physics has been corrected.

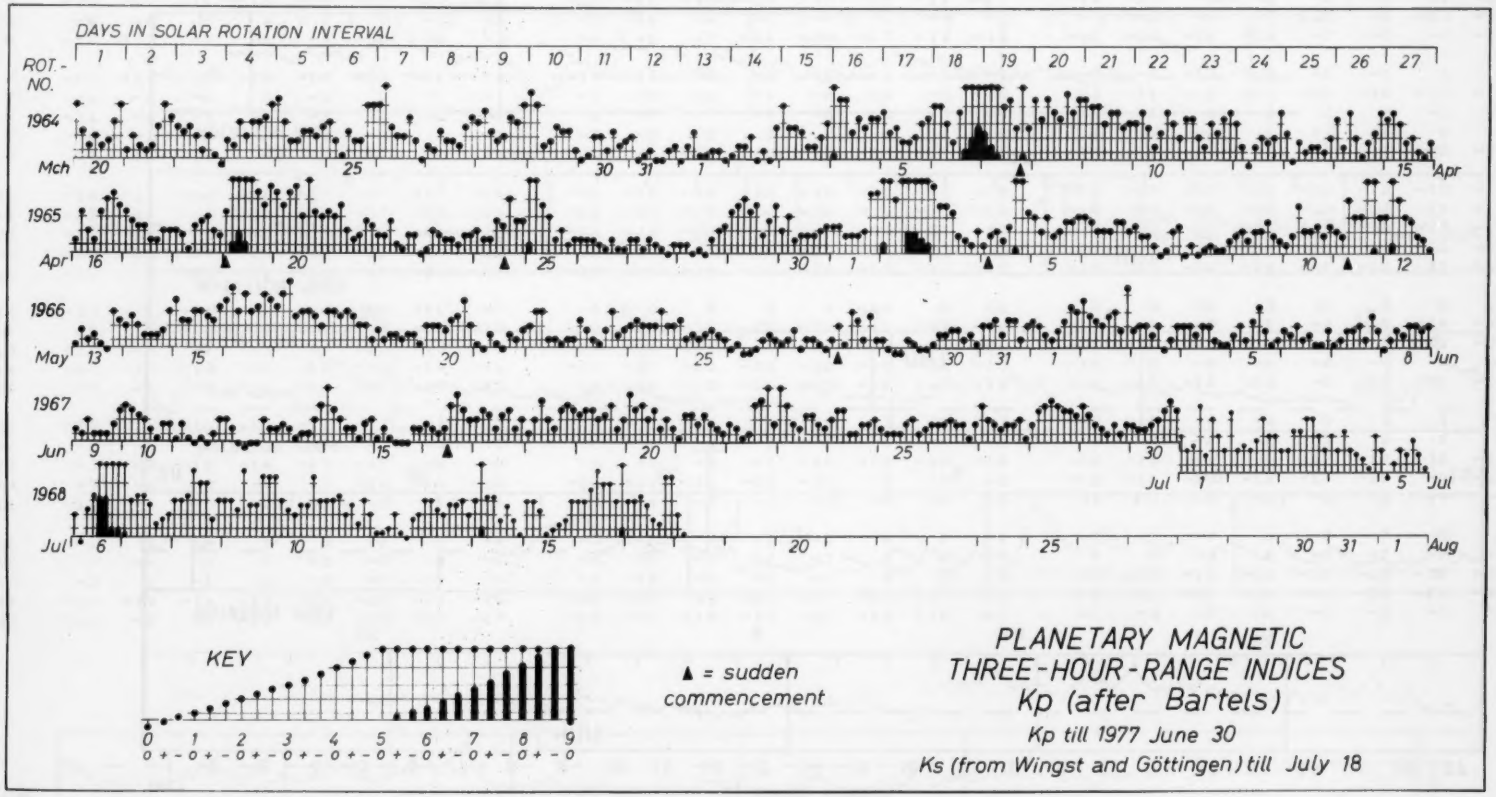
Quiet days (Q) and disturbed days (D), geomagnetic planetary three-hour-range indices (Kp) (integers alone are equivalent to those normally given with a small zero), magnetic character figures (Cp), and average amplitude (Ap) (unit 2γ) prepared by Geophysikalisches Institut at the University of Göttingen, F.R. of Germany for the International Service of Geomagnetic Indices. Ten most quiet days (Q1-Q0(10)) and five most disturbed days (D1-D5) are ordered from most quiet or disturbed, respectively. A or K means "not really quiet" (A = "Ap>6", K = "Ap <6 but one Kp >3o or two Kp values >3-"). An * means "not really disturbed" (Ap<20).

Geoagnetic three-hourly indices (Kn), (Ks) and (Km) as in IAGA-Bulletin No. 32 and indices (aa), "antipodal", as in IAGA-Bulletin No. 33 prepared by P. N. Mayaud of the Institut de Physique du Globe, Paris, France. Really quiet (C) and quiet but slightly disturbed three-hourly intervals (K) are given for 24-hour and 48-hour intervals centered on 12 UT.

# DAILY AVERAGE INDICES Ap

| | 1976 | | | | | | 1977 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY | JUL | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN |
| 1 | 18 | 8 | 10 | 14 | 10 | 7 | 17 | 7 | 11 | 4 | 13 | 9 |
| 2 | 9 | 8 | 24 | 21 | 7 | 3 | 5 | 21 | 5 | 5 | 66 | 14 |
| 3 | 12 | 10 | 10 | 9 | 6 | 4 | 6 | 11 | 4 | 12 | 15 | 6 |
| 4 | 14 | 5 | 14 | 6 | 4 | 15 | 10 | 4 | 3 | 24 | 19 | 5 |
| 5 | 6 | 6 | 9 | 13 | 3 | 6 | 15 | 9 | 4 | 12 | 11 | 7 |
| 6 | 6 | 5 | 7 | 11 | 2 | 3 | 10 | 14 | 6 | 49 | 10 | 5 |
| 7 | 9 | 5 | 10 | 6 | 3 | 10 | 7 | 18 | 5 | 48 | 6 | 6 |
| 8 | 13 | 4 | 7 | 6 | 6 | 23 | 6 | 18 | 12 | 27 | 3 | 6 |
| 9 | 10 | 12 | 6 | 6 | 8 | 16 | 6 | 25 | 38 | 22 | 7 | 6 |
| 10 | 6 | 9 | 5 | 6 | 18 | 13 | 3 | 12 | 19 | 13 | 9 | 8 |
| 11 | 4 | 5 | 4 | 8 | 23 | 13 | 14 | 13 | 18 | 14 | 24 | 4 |
| 12 | 5 | 3 | 8 | 14 | 24 | 15 | 12 | 7 | 22 | 8 | 19 | 4 |
| 13 | 4 | 3 | 5 | 8 | 31 | 8 | 7 | 12 | 13 | 5 | 6 | 6 |
| 14 | 6 | 4 | 10 | 7 | 16 | 4 | 18 | 11 | 12 | 12 | 8 | 9 |
| 15 | 19 | 2 | 10 | 33 | 9 | 2 | 13 | 8 | 5 | 10 | 14 | 3 |
| 16 | 16 | 6 | 6 | 29 | 5 | 8 | 7 | 6 | 6 | 17 | 22 | 10 |
| 17 | 5 | 5 | 10 | 30 | 7 | 10 | 6 | 9 | 9 | 9 | 18 | 8 |
| 18 | 6 | 4 | 33 | 19 | 5 | 28 | 10 | 17 | 11 | 8 | 11 | 10 |
| 19 | 6 | 6 | 20 | 7 | 9 | 7 | 8 | 6 | 5 | 48 | 5 | 10 |
| 20 | 4 | 5 | 51 | 7 | 7 | 5 | 12 | 5 | 13 | 28 | 10 | 11 |
| 21 | 3 | 8 | 24 | 7 | 4 | 4 | 5 | 7 | 10 | 12 | 4 | 6 |
| 22 | 4 | 5 | 17 | 5 | 5 | 8 | 7 | 8 | 7 | 6 | 7 | 10 |
| 23 | 5 | 30 | 12 | 6 | 4 | 5 | 6 | 18 | 14 | 5 | 7 | 10 |
| 24 | 4 | 25 | 7 | 6 | 3 | 6 | 8 | 14 | 12 | 11 | 8 | 7 |
| 25 | 9 | 24 | 24 | 5 | 11 | 9 | 9 | 11 | 12 | 22 | 5 | 5 |
| 26 | 4 | 18 | 13 | 4 | 9 | 6 | 4 | 8 | 16 | 4 | 2 | 6 |
| 27 | 8 | 13 | 12 | 7 | 8 | 6 | 4 | 3 | 8 | 4 | 4 | 7 |
| 28 | 16 | 10 | 5 | 5 | 2 | 6 | 13 | 7 | 15 | 4 | 7 | 12 |
| 29 | 18 | 6 | 10 | 3 | 6 | 45 | 15 | | 14 | 18 | 2 | 7 |
| 30 | 19 | 6 | 9 | 16 | 11 | 13 | 30 | | 5 | 8 | 5 | 9 |
| 31 | 7 | 5 | | 34 | | 12 | 19 | | 4 | | 7 | |
| MEAN | 9 | 9 | 13 | 12 | 9 | 10 | 10 | 11 | 11 | 16 | 11 | 8 |

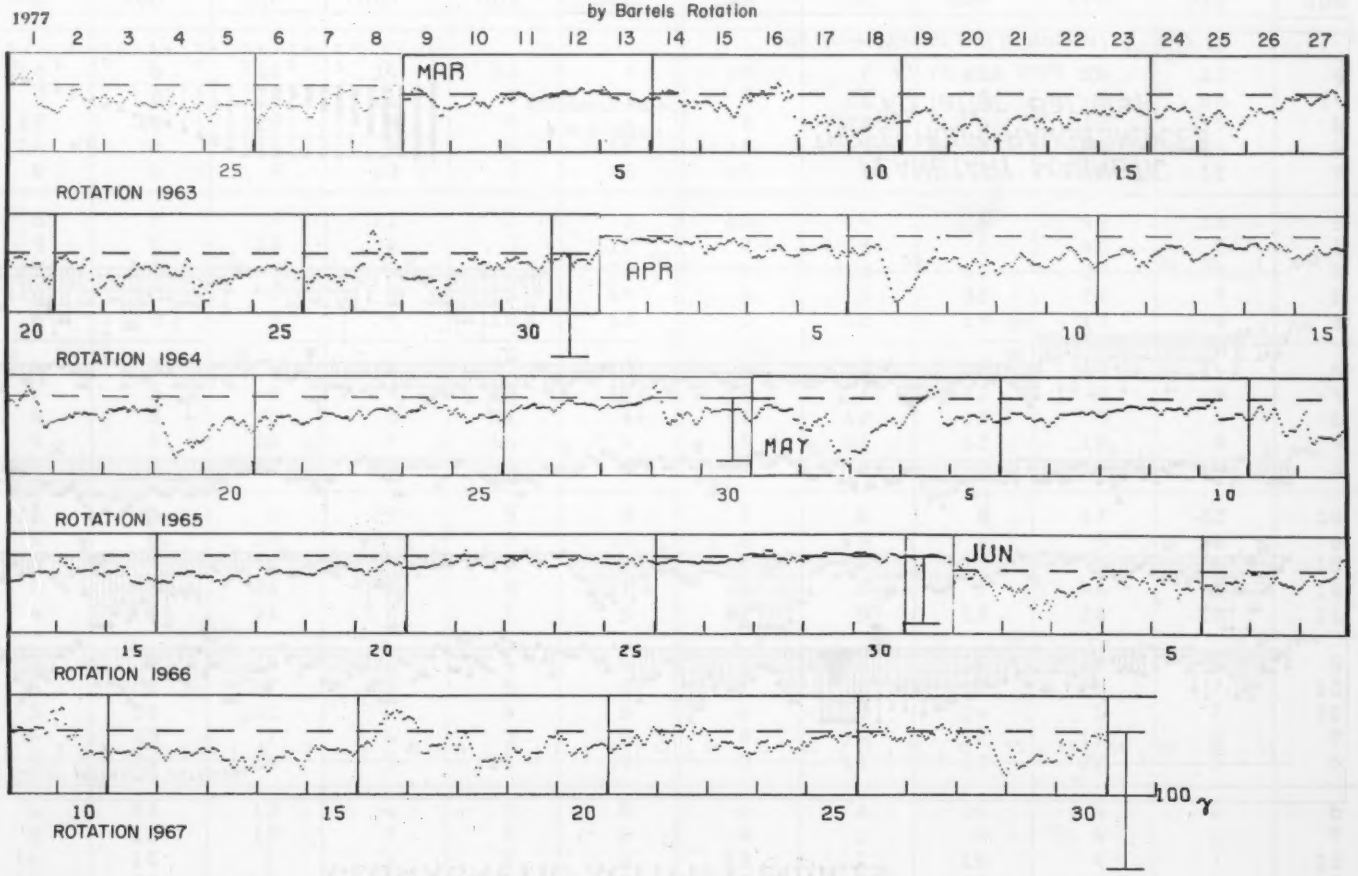
# GEOMAGNETIC ACTIVITY INDICES



# GEOMAGNETIC ACTIVITY INDICES

## Hourly Equatorial Dst

by Bartels Rotation




Note the sensitivity indicator for each month on the last day of the month and also note that the zero reference level is different for each month.

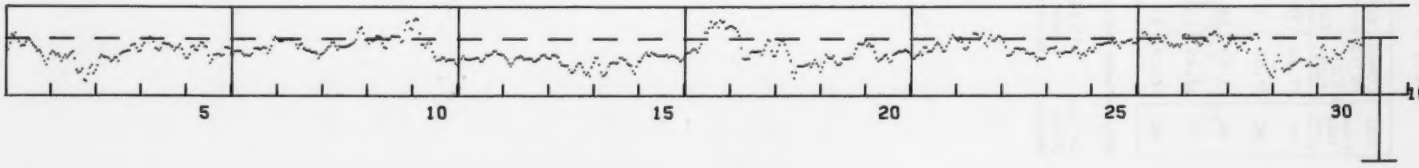
# HOURLY EQUATORIAL Dst VALUES (PROVISIONAL)

NASA/GODDARD SPACE FLIGHT CENTER

JUNE 1977

(Time-UT) (Units-Gammas)

| DAY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -9 | -4 | 3 | 1 | 4 | -1 | -3 | -7 | -6 | -6 | -3 | -1 | -2 | -4 | -6 | -8 | -11 | -10 | -12 | -15 | -19 | -22 | -17 | -13 |
| 2 | -11 | -12 | -14 | -13 | -15 | -19 | -16 | -14 | -16 | -14 | -12 | -11 | -17 | -26 | -28 | -27 | -25 | -34 | -35 | -29 | -24 | -22 | -29 | -26 |
| 3 | -22 | -16 | -14 | -15 | -16 | -16 | -17 | -19 | -18 | -16 | -16 | -19 | -13 | -12 | -11 | -11 | -10 | -10 | -6 | -5 | -5 | -8 | -11 | -10 |
| 4 | -6 | -4 | 0 | 0 | 1 | 0 | -3 | -8 | -9 | -10 | -8 | -4 | -4 | -5 | -5 | -6 | -7 | -10 | -8 | -7 | -5 | -9 | -13 | -16 |
| 5 | -16 | -13 | -7 | -6 | -9 | -10 | -6 | -3 | -4 | -6 | -7 | -14 | -20 | -17 | -13 | -13 | -12 | -13 | -14 | -13 | -7 | -7 | -8 | -12 |
| 6 | -13 | -10 | -10 | -10 | -10 | -12 | -14 | -13 | -14 | -14 | -12 | -8 | -8 | -8 | -9 | -8 | -7 | -8 | -12 | -9 | -6 | -1 | 1 | 0 |
| 7 | -2 | -2 | -2 | 0 | -1 | 0 | -1 | -1 | -1 | -5 | -8 | -5 | -4 | -8 | -9 | -10 | -9 | -11 | -11 | -11 | -12 | -16 | -13 | -12 |
| 8 | -11 | -9 | -7 | -6 | -3 | -3 | -6 | -9 | -6 | -7 | -7 | -7 | -6 | -6 | -5 | -4 | -3 | -1 | 5 | 8 | 9 | 4 | -1 | -2 |
| 9 | -4 | -1 | -2 | -1 | 2 | 2 | 1 | -4 | -7 | -8 | -1 | 0 | 2 | 2 | 1 | 2 | 1 | -3 | -2 | 7 | 13 | 14 | 8 | 7 |
| 10 | 15 | 16 | 15 | 4 | -5 | -5 | -7 | -4 | -1 | -4 | -11 | -15 | -18 | -17 | -17 | -15 | -16 | -18 | -17 | -17 | -17 | -17 | -20 | -21 |
| 11 | -16 | -16 | -14 | -16 | -17 | -17 | -17 | -16 | -16 | -15 | -16 | -18 | -18 | -16 | -13 | -14 | -13 | -12 | -10 | -10 | -12 | -12 | -13 | -13 |
| 12 | -15 | -17 | -20 | -22 | -20 | -17 | -15 | -15 | -14 | -15 | -17 | -16 | -16 | -16 | -16 | -18 | -18 | -17 | -16 | -14 | -13 | -13 | -15 | -16 |
| 13 | -16 | -13 | -13 | -14 | -15 | -19 | -21 | -22 | -22 | -22 | -25 | -27 | -27 | -25 | -22 | -20 | -20 | -23 | -27 | -29 | -27 | -30 | -23 | -19 |
| 14 | -15 | -15 | -21 | -27 | -30 | -29 | -27 | -22 | -20 | -19 | -19 | -20 | -19 | -15 | -15 | -17 | -17 | -20 | -21 | -22 | -26 | -28 | -22 | -18 |
| 15 | -16 | -15 | -13 | -11 | -13 | -14 | -11 | -12 | -13 | -14 | -14 | -14 | -14 | -14 | -13 | -15 | -14 | -14 | -14 | -15 | -16 | -18 | -17 | -15 |
| 16 | -12 | -11 | -11 | -9 | -8 | -9 | -11 | -7 | -4 | 0 | 5 | 5 | 9 | 14 | 9 | 12 | 13 | 9 | 15 | 13 | 14 | 8 | 9 | 10 |
| 17 | 10 | 9 | 8 | 6 | 2 | -8 | -16 | -17 | -16 | -16 | -11 | -10 | -11 | -11 | -10 | -10 | -13 | -9 | -5 | -1 | -2 | -10 | -14 | -14 |
| 18 | -10 | -5 | -1 | -2 | -5 | -10 | -13 | -18 | -27 | -32 | -27 | -22 | -22 | -22 | -22 | -21 | -21 | -20 | -23 | -20 | -17 | -20 | -22 | -27 |
| 19 | -23 | -19 | -13 | -15 | -16 | -16 | -14 | -19 | -21 | -21 | -20 | -16 | -16 | -16 | -16 | -15 | -16 | -12 | -8 | -4 | -4 | -5 | -4 | -2 |
| 20 | -6 | -4 | -6 | -6 | -11 | -16 | -18 | -17 | -16 | -14 | -13 | -16 | -19 | -18 | -13 | -12 | -11 | -10 | -11 | -10 | -9 | -10 | -11 | -13 |
| 21 | -16 | -16 | -14 | -13 | -11 | -13 | -7 | -7 | -11 | -10 | -10 | -8 | -5 | -3 | -5 | -7 | -10 | -10 | -6 | -3 | 0 | 3 | 1 | 0 |
| 22 | -2 | 1 | -3 | -8 | -9 | -7 | -3 | 0 | 4 | 4 | 3 | -1 | 1 | 4 | -4 | -6 | 0 | 3 | -2 | -2 | 0 | 2 | 1 | 0 |
| 23 | -3 | -7 | -14 | -14 | -13 | -11 | -8 | -8 | -8 | -9 | -8 | -9 | -12 | -12 | -13 | -12 | -12 | -15 | -18 | -16 | -17 | -17 | -16 | -12 |
| 24 | -9 | -8 | -8 | -8 | -7 | -12 | -15 | -12 | -12 | -11 | -11 | -11 | -11 | -9 | -7 | -8 | -12 | -16 | -13 | -12 | -14 | -10 | -8 | -11 |
| 25 | -11 | -8 | -5 | -5 | -5 | -5 | -4 | -4 | -3 | -4 | -2 | -4 | -3 | -6 | -8 | -3 | -4 | -3 | -2 | -2 | -1 | -4 | -4 | -4 |
| 26 | -1 | 0 | 4 | 5 | 3 | -1 | -2 | -4 | -3 | 0 | 3 | -3 | -3 | 2 | 0 | -4 | -6 | -5 | -7 | -6 | -5 | -7 | -5 | 2 |
| 27 | 3 | -4 | 2 | 0 | -3 | -4 | -2 | -4 | -6 | -5 | -2 | -2 | -3 | 3 | 3 | 4 | 5 | 2 | -3 | 1 | -1 | -7 | -7 | -4 |
| 28 | -2 | 2 | -1 | -5 | -8 | -7 | -10 | -4 | -4 | -12 | -9 | -1 | -1 | 3 | 3 | 0 | -9 | -14 | -18 | -22 | -25 | -28 | -30 | -32 |
| 29 | -27 | -19 | -14 | -19 | -25 | -27 | -26 | -25 | -25 | -23 | -22 | -21 | -20 | -18 | -17 | -18 | -18 | -23 | -22 | -20 | -22 | -23 | -22 | -21 |
| 30 | -14 | -8 | -6 | -10 | -16 | -19 | -20 | -17 | -10 | -13 | -14 | -14 | -17 | -12 | -10 | -7 | -3 | -3 | -3 | -2 | -5 | -2 | -6 | -7 |



# PRINCIPAL MAGNETIC STORMS

**JUNE 1977**

| OBS. 2 letter IAGA code | GEOMAG-NETIC LATI-TUDE | COMMENCEMENT DAY | hr min (UT) | TYPE | SC - AMPLITUDES D(') | H(γ) | Z(γ) | MAXIMUM 3 HOUR - INDEX K DAY(3 HOUR PERIOD) | K | RANGES D(') | H(γ) | Z(γ) | UT END DAY | HOUR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HO | 07.6N | 3 | 1215 | SC | - 0.3 | +13 | - 1 | 03(5) | 3 | 4 | 71 | 15 | 04 | 15 |
| HO | 07.6N | 5 | 0643 | SC | - 0.2 | + 7 | - 1 | 05(4,5) | 4 | 6 | 106 | 24 | 06 | 14 |
| HO | 07.6N | 16 | 0728 | SC | - 0.2 | + 5 | 0 | 16(6) | 4 | 5 | 72 | 27 | 17 | 16 |
| HO | 07.6N | 26 | 2306 | SC | - 0.2 | + 7 | 0 | 28(3) | 4 | 6 | 77 | 27 | 28 | 22 |
| HO | 07.6N | 30 | 1413 | SC | 0 | + 5 | 0 | 30(7) 01(3,4,6) | 3 | 6 | 70 | 35 | 02 | 21 |

Reports were received from the following observatories:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| College | Witteveen | Tucson | Jaipur | Alibag | Annamalaingar | Port Moresby | Toolangi |
| Sitka | Fredericksburg | San Juan | Shillong | Hyderabad | Huancayo | Hermanus | Port-aux-Francais |
| Newport | Boulder | Honolulu | Ujjain | Guam | Trivandrum | Gnangara | |

# SUDDEN COMMENCEMENTS AND SOLAR FLARE EFFECTS

## JUNE 1977

PRELIMINARY REPORT ON RAPID MAGNETIC VARIATIONS (by Dr. A. Romana).
The meaning of the stations symbols is given in the IAGA-Bulletin nr. 32.
Times of ssc are mean values.

Sudden commencements followed by a magnetic storm or a period of storminess (ssc)

None

Solar-flare effects (sfe)
Effects confirmed by ionospheric or solar observations are underlined.

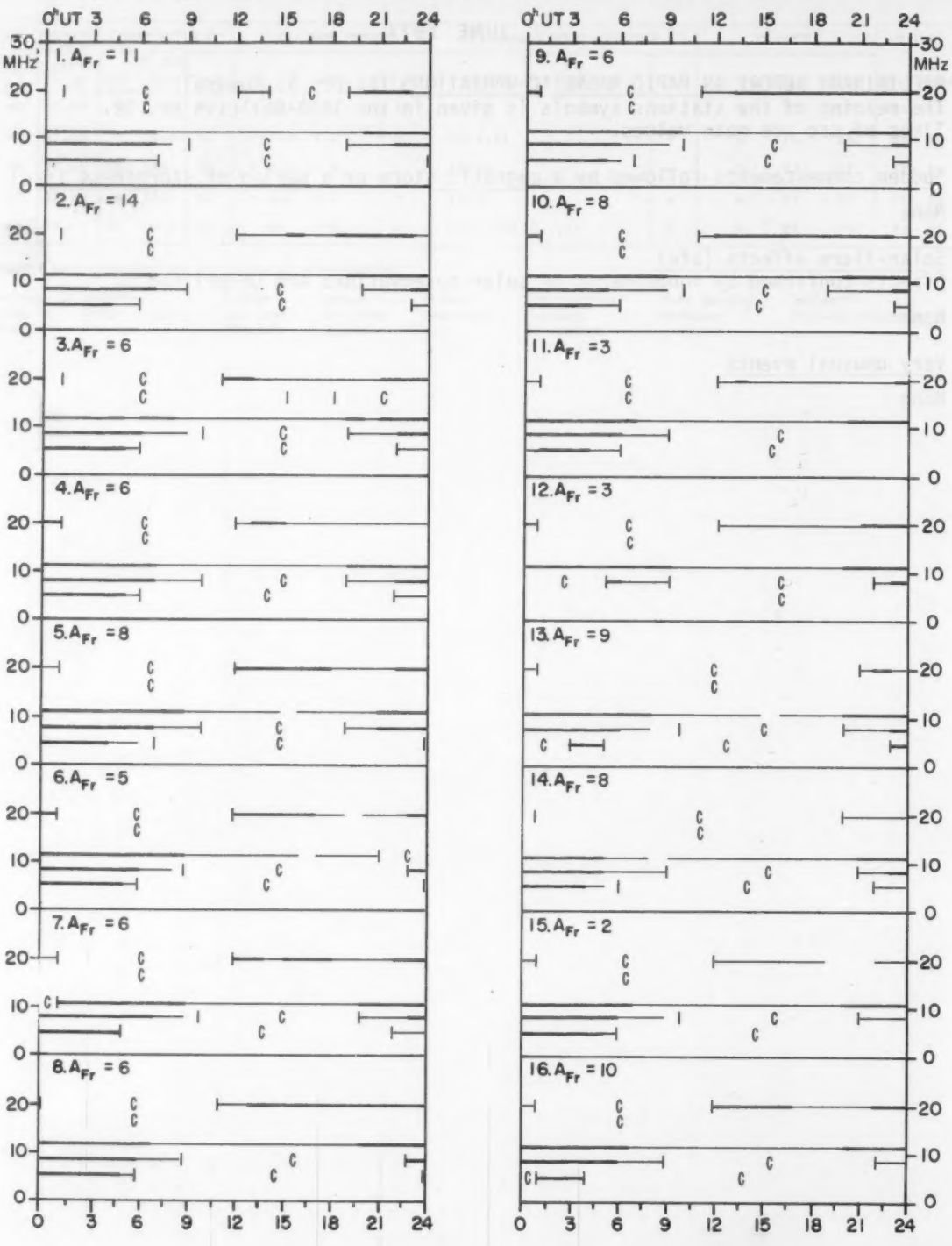
None

Very unusual events

None

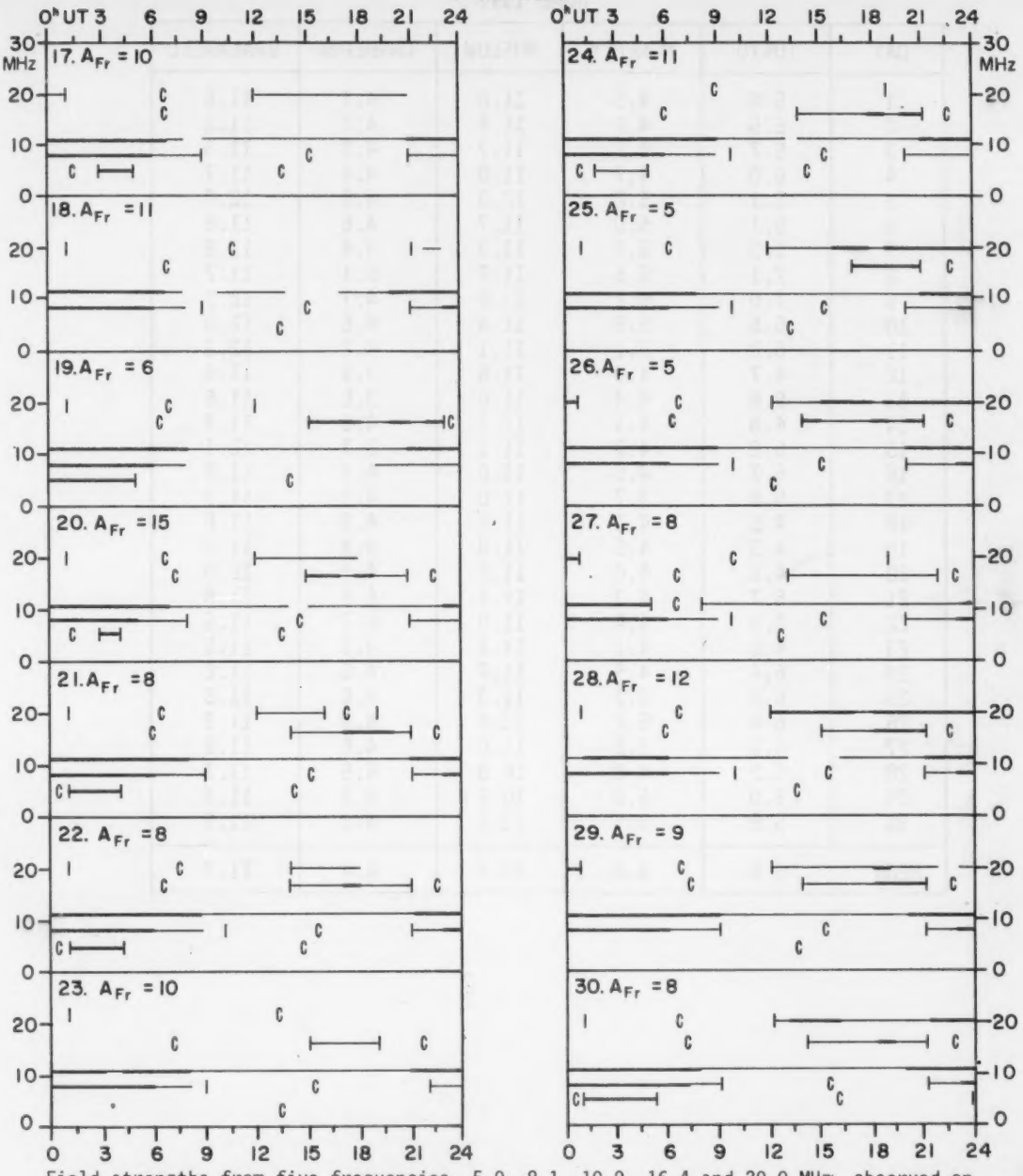
# TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

JUNE 1977



# TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

JUNE 1977




Field strengths from five frequencies, 5.0, 8.1, 10.9, 16.4 and 20.0 MHz, observed on a Lüchow - Norfolk circuit are represented above. Heavy solid lines represent field strengths ≥ -12 dB above 1 μv/m (transmitter power reduced to 1 kW). Observed field strengths between -12 dB above 1 μv/m and -40 dB above 1 μv/m are represented by the fine line.

Adapted from Observations by Deutsche Bundespost

# RADIO PROPAGATION QUALITY INDICES

JUNE 1977

| DAY | TOKYO | NORFOLK | MOSCOW | CANBERRA | BRACKNELL |
|---|---|---|---|---|---|
| 1 | 5.4 | 4.5 | 11.8 | 4.1 | 11.5 |
| 2 | 5.5 | 4.7 | 11.4 | 4.7 | 11.3 |
| 3 | 5.7 | 4.7 | 11.7 | 4.3 | 11.3 |
| 4 | 6.0 | 4.7 | 11.8 | 4.4 | 11.7 |
| 5 | 5.1 | 5.2 | 12.3 | 4.6 | 12.0 |
| 6 | 5.1 | 5.0 | 11.7 | 4.6 | 11.8 |
| 7 | 5.3 | 5.5 | 11.3 | 4.4 | 11.8 |
| 8 | 7.1 | 5.6 | 11.2 | 5.1 | 11.7 |
| 9 | 7.0 | 6.2 | 11.6 | 4.7 | 12.2 |
| 10 | 5.6 | 5.8 | 11.4 | 4.5 | 12.0 |
| 11 | 6.2 | 5.1 | 11.1 | 4.2 | 12.1 |
| 12 | 4.7 | 4.9 | 11.6 | 3.9 | 11.6 |
| 13 | 5.6 | 4.4 | 11.6 | 3.8 | 11.6 |
| 14 | 4.8 | 4.1 | 11.1 | 4.0 | 11.9 |
| 15 | 5.8 | 4.7 | 11.3 | 3.7 | 12.1 |
| 16 | 5.7 | 4.6 | 11.0 | 4.1 | 11.8 |
| 17 | 5.8 | 3.7 | 11.0 | 4.3 | 11.7 |
| 18 | 4.0 | 4.1 | 11.5 | 4.3 | 11.8 |
| 19 | 4.3 | 4.5 | 11.8 | 4.4 | 11.5 |
| 20 | 4.8 | 4.0 | 11.5 | 4.3 | 12.0 |
| 21 | 5.7 | 4.3 | 11.1 | 4.2 | 11.8 |
| 22 | 5.4 | 4.4 | 11.0 | 4.7 | 11.6 |
| 23 | 4.6 | 4.1 | 11.2 | 4.3 | 11.5 |
| 24 | 6.4 | 4.5 | 11.7 | 4.6 | 11.2 |
| 25 | 6.0 | 5.2 | 11.3 | 4.5 | 11.5 |
| 26 | 6.4 | 5.2 | 11.6 | 4.8 | 11.3 |
| 27 | 5.8 | 3.8 | 11.0 | 4.6 | 11.5 |
| 28 | 6.2 | 4.8 | 10.8 | 4.5 | 11.7 |
| 29 | 5.0 | 5.0 | 10.9 | 4.9 | 11.7 |
| 30 | 5.8 | 5.5 | 11.6 | 4.5 | 11.5 |
| MEAN | 5.6 | 4.8 | 11.4 | 4.4 | 11.7 |

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August 1977 Number 396-Part II

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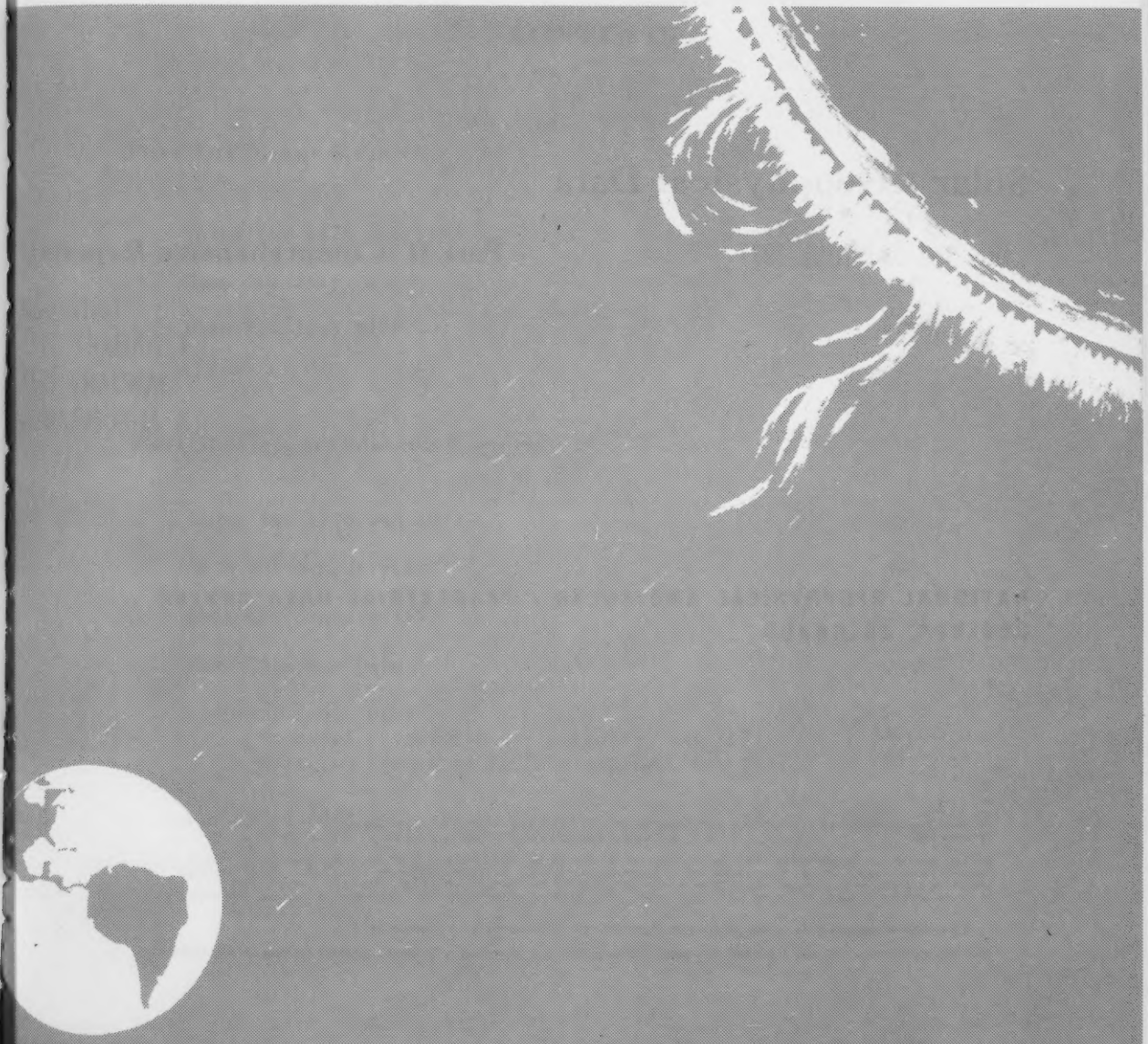
Data for February 1977–January 1977 & Miscellanea

Explanation of Data Reports Issued as Number 390 (Supplement) February 1977



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# Solar - Geophysical Data

NO. 396 AUGUST 1977

## Part II (Comprehensive Reports)

DATA FOR
FEBRUARY 1977
JANUARY 1977
& MISCELLANEA

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# SOLAR - GEOPHYSICAL DATA

No. 396

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Director
Solar - Terrestrial Data Services Division

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| C.3t | 43.25, 80 and 160 MHz Selected Bursts (Culgoora) | 390B 42 | 390B 43 | 390B 44 | 391B 45 | 391B 46 | 393B 40 | 393B 41 | 393A108 | 394A105 | 396B 41 | | |
| C.4a | Solar Radio Spectral Obs. (Fort Davis) | 386A 91 | 387A 95 | 388A 96 | 389A 92 | 390A 97 | 391A103 | 392A 90 | 393A102 | 394A 98 | 395A106 | 396A102 | |
| C.4b | Solar Radio Spectral Obs. (Boulder) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |
| C.4d | Solar Radio Spectral Obs. (Culgoora) | 387B 32 | 389B 29 | 389B 32 | 389A 92 | 391B 47 | 391A103 | 393B 37 | 393A102 | 394A 98 | 396B 38 | | |
| C.4e | Solar Radio Spectral Obs. (Weissenau) | 386A 91 | 387A 95 | 388A 96 | 389A 92 | 390A 97 | 391A103 | 392A 90 | 393A102 | 394A 98 | 395A106 | | |
| C.4f | Solar Radio Spectral Obs. (Sagamore Hill) | 386A 91 | 387A 95 | 388A 96 | 389A 92 | 390A 97 | 391A103 | 392A 90 | 393A102 | 394A 98 | 395A106 | 396A102 | |
| C.4h | Solar Radio Spectral Obs. (Dwingeloo) | 386A 91 | 387A 95 | 388A 96 | 389A 92 | 390A 97 | 391A103 | 392A 90 | 393A102 | 394A 98 | 395A106 | 396A102 | |
| C.4i | Solar Radio Spectral Obs. (Dürnten) | 386A 91 | 387A 95 | 388A 96 | 389A 92 | 390A 97 | 391A103 | 392A 90 | 393A102 | 394A 98 | 395A106 | 396A102 | |
| C.4j | Solar Radio Spectral Obs. (Manila) | 386A 91 | 387A 95 | 388A 96 | 389A 92 | 390A 97 | 391A103 | 392A 90 | 393A102 | 394A 98 | 395A106 | 396A102 | |
| C.5e | Solar X-ray (SMS/GOES) | 385A 20 | --- | --- | --- | 389A 20 | 390A 17 | 391A 21 | 392A 17 | 393A 22 | 394A 20 | 395A 21 | 396A 17 |
| C.5f | Solar X-ray (Columbia U.) | | | | | | | | | | | | |
| C.6 | Sudden Ionospheric Disturbances | 386A 90 | 387A 94 | 388A 95 | 389A 91 | 390A 96 | 391A102 | 392A 89 | 393A101 | 394A 97 | 395A105 | 396A100 | |
| D. | Geomagnetic and Magnetospheric Phenomena | | | | | | | | | | | | |
| D.1a | Geomagnetic Indices Kp, Kn, Ks, Km, Ap, aa, Cp | 386A104 | 387A108 | 388A108 | 389A102 | 390A107 | 391A114 | 392A 97 | 393A114 | 394A111 | 395A115 | 396A111 | |
| D.1ba | 27-day Chart of Kp Indices | 386A106 | 387A110 | 388A110 | 389A104 | 390A109 | 391A116 | 392A 99 | 393A116 | 394A113 | 395A117 | 396A113 | |
| D.1c | 27-day Chart of C9 | 390A110 | 390A110 | 390A110 | 390A110 | 390A110 | | | | | | | |
| D.1d | Principal Magnetic Storms | 386A109 | 387A113 | 388A113 | 389A107 | 390A114 | 391A117 | 392A101 | 393A119 | 394A116 | 395A120 | 396A116 | |
| D.1e | Reduced Magnetograms | --- | | | --- | --- | | | | | --- | | |
| D.1f | Sudden Commencement and Solar Flare Effects | 386A110 | 387A114 | 388A114 | 389A108 | 390A115 | 392B 38 | 392A102 | 393A120 | 394A117 | 395A121 | 396A117 | |
| D.1g | Equatorial Indices Dst | 386A108 | 387A112 | 388A112 | 389A106 | 390A113 | | 392A100 | 393A118 | 394A115 | 395A119 | 396A115 | |
| F. | Cosmic Rays | | | | | | | | | | | | |
| F.1a | Cosmic Ray Neutron Counts (Deep River) | 386A 95 | 387A103 | 388A103 | 389A 97 | 390A106 | 391A109 | 393B 44 | 393A109 | 394A110 | 395A114 | 396A110 | |
| F.1b | Cosmic Ray Neutron Counts (Climax) | 386A 99 | 387A103 | 388A103 | 389A 97 | 390A106 | 391A109 | 392A 96 | 393A109 | 394A110 | 395A114 | 396A110 | |
| F.1e | Cosmic Ray Neutron Counts (Alert) | 386A 99 | 387A103 | 388A103 | 389A 97 | 390A106 | 391A109 | 393B 44 | 393A109 | 394A110 | 395A114 | 396A110 | |
| F.1f | Cosmic Ray Neutron Counts (Calgary) | 386A 99 | 387A103 | 388A103 | 389A 97 | 390A106 | 393B 44 | 394B 36 | 394A110 | 395A114 | 396A110 | | |
| F.1g | Cosmic Ray Neutron Counts (Sulphur Mountain) | 386A 99 | 387A103 | 388A103 | 389A 97 | 390A106 | 393B 44 | 394B 36 | 394B 36 | 394A110 | 395A114 | 396A110 | |
| F.1h | Cosmic Ray Neutron Counts (Thule) | --- | --- | --- | --- | --- | | | | | | | |
| F.1i | Cosmic Ray Neutron Counts (Kiel) | 386A 99 | 387A103 | 388A103 | 389A 97 | 390A106 | 391A109 | 392A 96 | 393A109 | 394A110 | 395A114 | 396A110 | |
| F.1j | Cosmic Ray Neutron Counts (Tokyo) | 386A 99 | 387A103 | 388A103 | 389A 97 | 390A106 | 391A109 | 392A 96 | 393A109 | 394A110 | 395A114 | 396A110 | |
| F.1k | Cosmic Ray Neutron Counts (Kula) | | | | | | | | | | 395A114 | 396A110 | |
| H. | Miscellaneous | | | | | | | | | | | | |
| H.60 | IUWDS Alert Decisions | 385A 5 | 386A 5 | 387A 4 | 388A 5 | 389A 4 | 390A 4 | 391A 5 | 392A 5 | 393A 5 | 394A 5 | 395A 4 | 396A 5 |
| H.62 | Abbreviated Calendar Record | 391B 32 | 392B 28 | 393B 24 | 394B 26 | 395B 26 | 396A 28 | | | | | | |

Note: A = Part I, B = Part II.

386A 22 listed under 1976 Aug shows that data for August 1976 were contained in *Solar-Geophysical Data* Number 386 - Part I beginning on page 22.

# FEBRUARY 1977 DATA

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ACTIVE REGIONS

CARRINGRON ROTATION 1651

(January 28 - February 24, 1977)

| Region No. | Coordinates | | Age at CMP | IMP. | Spot-less Region | Region No. in Rotation 1650 | Activity at West Limb |
|---|---|---|---|---|---|---|---|
| | Lat. | Long. | | | | | |
| 1 | 6°S | 294° | +3 | 1 | x | | disappeared |
| 2 | 26 N | 256 | >6 | 3 | | | decreasing |
| 3 | 27 N | 244 | >6 | 1 | x | | dispersed |
| 4 | 20 N | 228 | -2 | 1 | x | | decreasing |
| 5 | 19 S | 204 | +6 | 1 | x | | disappeared |
| 6 | 30 S | 201 | >6 | 1 | x | (4) | decreasing |
| 7 | 22 N | 161 | -1 | 1 | x | | dispersed |
| 8 | 41 S | 160 | +6 | 4 | | | decreasing |
| 9 | 11 N | 151 | >6 | 1 | x | (6) | decreasing |
| 10 | 12 N | 143 | +1 | 1 | x | | dispersed |
| 11 | 23 N | 143 | +1 | 2 | | | decreasing |
| 12 | 4 N | 141 | >6 | 2 | | | decreasing |
| 13 | 22 S | 51 | >6 | 3 | | (9) | decreasing |
| 14 | 26 S | 6 | >6 | 1 | x | (12) | dispersed |

ACTIVE REGION

CARRINGTON ROTATION 1652

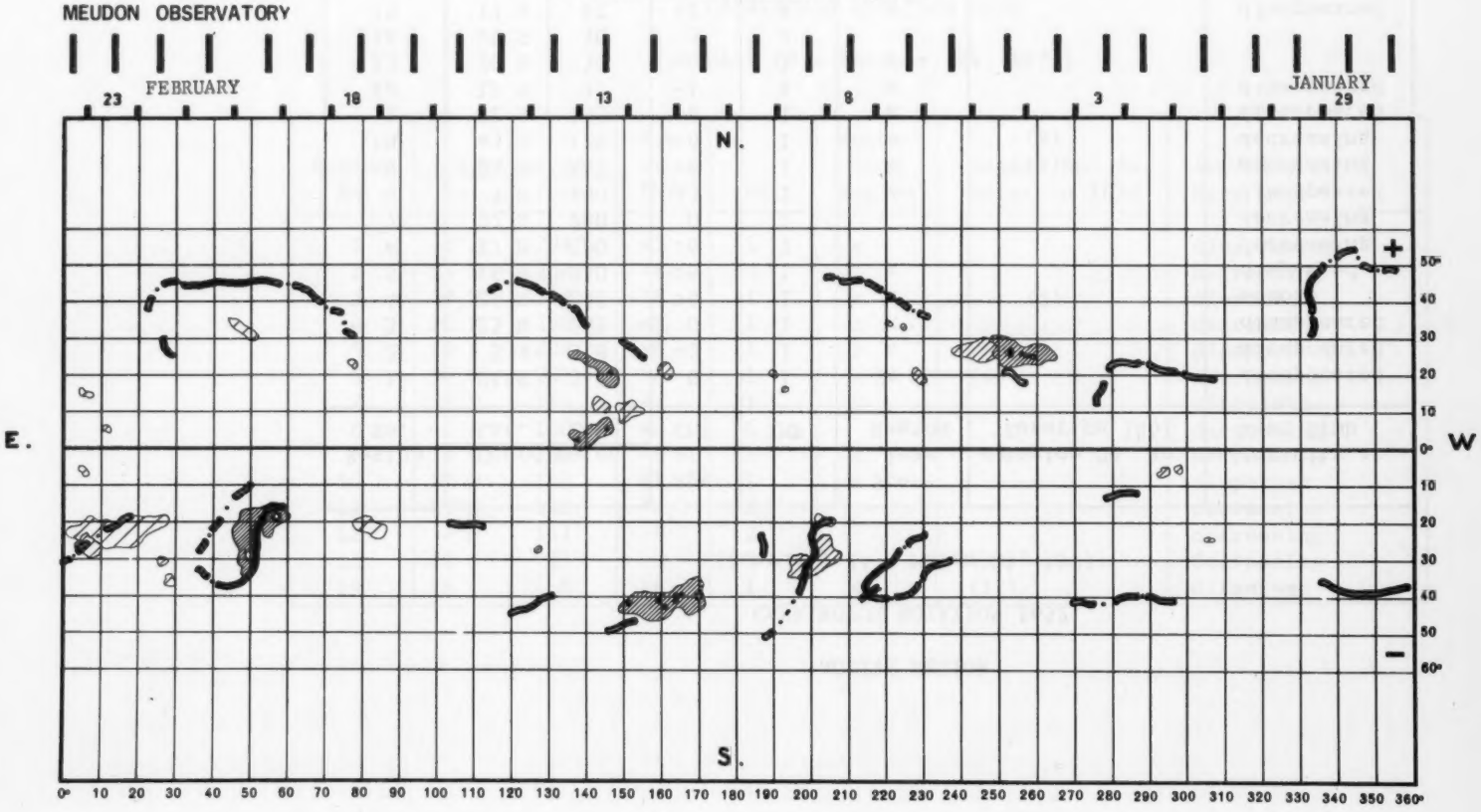
(February 24 - March 23, 1977)

| Region No. | Coordinates | | Age at CMP | IMP. | Spot-less Region | Region No. in Rotation 1651 | Activity at West Limb |
|---|---|---|---|---|---|---|---|
| | Lat. | Long. | | | | | |
| 1 | 24°N | 347° | 0 | 1 | x | | disappeared |
| 2 | 5 S | 318 | -3 | 1 | x | | disappeared |
| 3 | 25 N | 265 | 0 | 1 | x | | disappeared |
| 4 | 26 N | 255 | >6 | 1 | x | (2) | stable |
| 5 | 16 N | 210 | >6 | 1 | x | | dispersed |
| 6 | 17 N | 200 | >6 | 2 | | | decreasing |
| 7 | 22 N | 200 | 0 | 2 | | | decreasing |
| 8 | 5 N | 150 | +3 | 1 | x | | disappeared |
| 9 | 24 N | 143 | >6 | 1 | x | (11) | decreasing |
| 10 | 43 S | 129 | >6 | 1 | x | (8) | decreasing |
| 11 | 32 S | 108 | +6 | 1 | x | | disappeared |
| 12 | 19 S | 92 | -1 | 1 | x | | disappeared |
| 13 | 20 S | 56 | >6 | 1 | x | | |
| 14 | 29 S | 50 | -3 | 2 | | | |
| 15 | 17 N | 47 | +2 | 1 | x | | disappeared |
| 16 | 25 N | 46 | -2 | 1 | x | | stable |

# SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1651

JANUARY 28 TO FEBRUARY 24, 1977

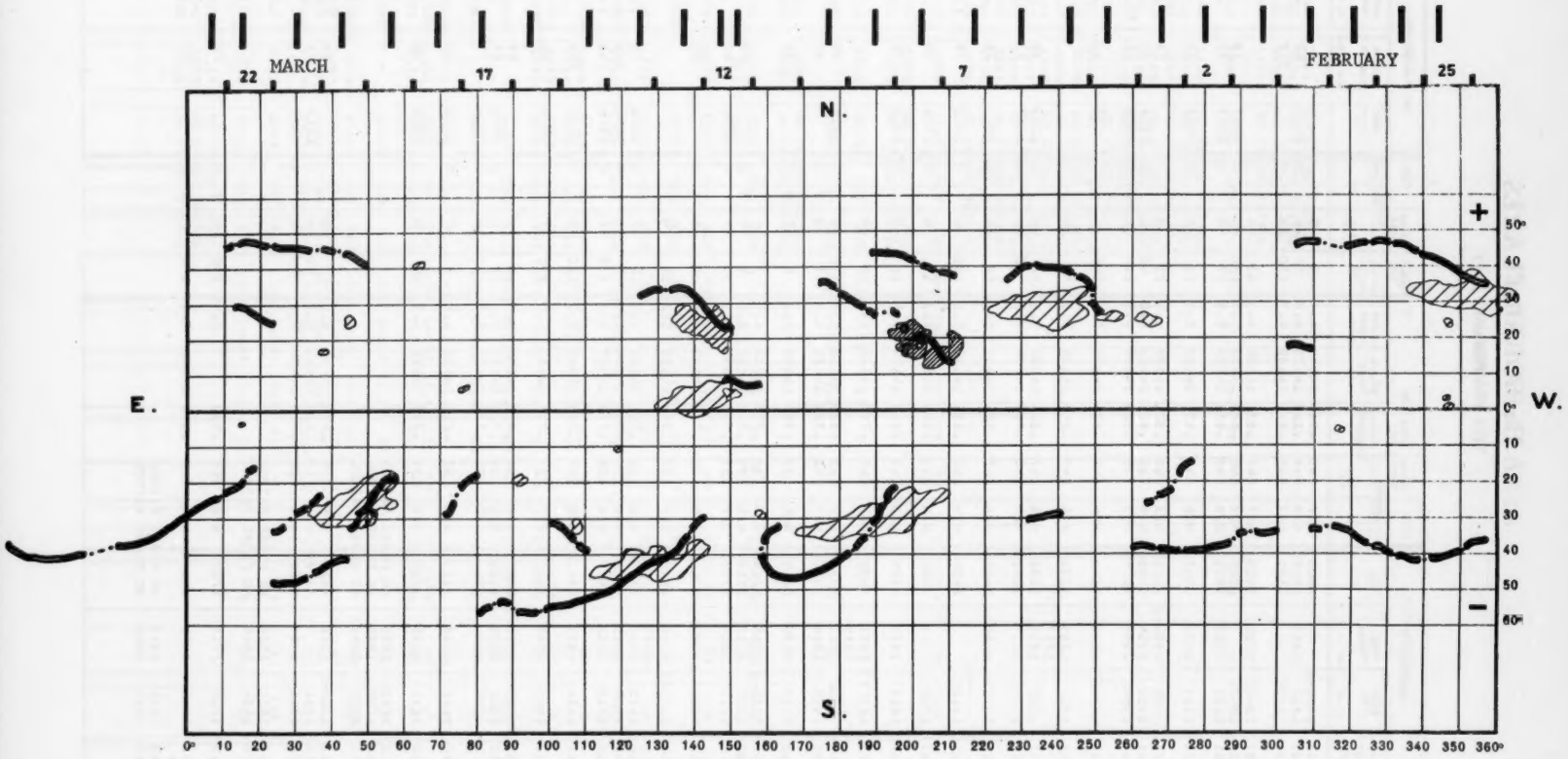


# SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1652

FEBRUARY 24 TO MARCH 23, 1977

MEUDON OBSERVATORY




7
Feb 77

# Hα SOLAR FLARES

## FEBRUARY 1977

| OBSERV-ATORY | OBSERVED UT | | | | LOCATION | | | | | DURA-TION | IMPOR-TANCE | OBS. | | MEASUREMENTS | | | REMARKS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DATE 1977 FEB | START | MAX. PHASE | END | APPROX LAT. | APPROX LON. DIST. | CENTRAL DISTANCE | McMATH PLAGE REGION | CMP DAY | MIN. | | CONF. | TYPE | TIME UT | MEAS. AREA Mill. of Disk | CORR AREA Sq. Deg. | | |
| GRP63748 | 01 | 0810+0 | | 0825 | N27 | E45 | .815 | 14630 | 4.7 | 15 | -B | | | | | | | |
| CATA | 01 | 0810 | 0815 | 0815D | N28 | E46 | .828 | 14630 | 4.8 | 5D | -B | 2 | P | 0815 | 45 | .8 | | |
| WEND | 01 | 0810E | | 0825 | N27 | E45 | .815 | 14630 | 4.7 | 15D | 1N | | P | | 300 | | | |
| GRP637+9 | 01 | 0847E | 0905 | 0919 | N27 | E47 | .831 | 14630 | 4.9 | 32 | -N | | | | | | | |
| HTPR | 01 | 0847E | | 0905 | N28 | E46 | .828 | 14630 | 4.8 | 18D | -F | | C | 0847 | 10 | .2 | D | |
| HTPR | 01 | 0852 | 0905 | 0919 | N26 | E48 | .834 | 14630 | 5.0 | 27 | -N | | C | 0905 | 30 | .5 | D | |
| 750 HTPR | 01 | 0929 | 0932 | 0945 | N26 | E48 | .834 | 14630 | 5.0 | 16 | -F | | C | 0932 | 20 | .4 | D | Y5 |
| GRP63751 | 01 | 0952 | 0954+2 | 1015D | N25 | E47 | .821 | 14630 | 4.9 | 23 | -N | | | | 50 | .9 | D | |
| HTPR | 01 | 0952 | 0954 | 0956D | N26 | E48 | .834 | 14630 | 5.0 | 4D | -N | | C | 0954 | 30 | .5 | D | |
| ATHN | 01 | 0954E | 0956 | 1015D | N25 | E46 | .813 | 14630 | 4.9 | 21D | -N | | V | 0956 | 66 | 179.0 | | |
| 752 HTPR | 01 | 1124E | 1133 | 1140 | N26 | E48 | .834 | 14630 | 5.1 | 16D | -N | | C | 1133 | 40 | .7 | E | Y5 |
| GRP63753 | 01 | 1207 | 1209 | 1230 | N26 | E45 | .810 | 14630 | 4.9 | 23 | -N | | | | | | OL | |
| | | | 1217 | | | | | | | | | | | | | | | |
| HTPR | 01 | 1207 | 1209 | 1230 | N26 | E47 | .826 | 14630 | 5.0 | 23 | -N | | C | 1209 | 30 | .5 | OL | |
| ATHN | 01 | 1214E | 1217 | 1221D | N25 | E43 | .789 | 14630 | 4.7 | 7D | -N | | V | 1217 | 82 | 220.0 | | |
| 754 HTPR | 01 | 1335 | 1340 | 1400 | N26 | E47 | .826 | 14630 | 5.1 | 25 | -F | | C | 1340 | 20 | .3 | E | Y5 |
| 755 MCMA | 01 | 1412E | | 1455 | N28 | E45 | .820 | 14630 | 5.0 | 43D | -N | | C | 1412 | 70 | 1.3 | E | Y5 |
| 756 MCMA | 01 | 1752 | 1756 | 1806 | N28 | E43 | .805 | 14630 | 5.0 | 14 | -N | | C | 1756 | 25 | .4 | D | Y5 |
| 757 MCMA | 01 | 1813 | 1818 | 1829 | N28 | E43 | .805 | 14630 | 5.0 | 16 | -N | | C | 1818 | 40 | .7 | E | Y5 |
| GRP63758 | 01 | 1850>9 | 1911 | 1936 | N27 | E42 | .792 | 14630 | 4.9 | 46 | -N | | | | | | EU | |
| | | | 1919 | | | | | | | | | | | | | | | |
| MCMA | 01 | 1850E | 1911 | 1939 | N28 | E43 | .805 | 14630 | 5.0 | 49D | -B | | C | 1911 | 70 | 1.2 | E | |
| RAMY | 01 | 1905 | 1919 | 1932 | N27 | E41 | .784 | 14630 | 4.9 | 27 | -N | 3 | C | | 97 | | UDE | |
| 759 PALE | 02 | 0139 | 0139 | 0144 | N26 | E39 | .762 | 14630 | 5.0 | 5 | -F | 3 | C | | 38 | | | Y5 |
| GRP6376O | 02 | 0215+0 | 0216 | 0218D | N26 | E38 | .753 | 14630 | 4.9 | 3 | -F | | | | | | F | |
| PALE | 02 | 0215 | 0216 | 0218 | N26 | E39 | .762 | 14630 | 5.0 | 3 | -F | 3 | C | | 63 | | F | |
| MITK | 02 | 0215 | 0236 | 0253 | N27 | E37 | .752 | 14630 | 4.9 | 38 | -F | | C | 0235 | 60 | .9 | | |
| 761 PALE | 02 | 0322 | 0323 | 0326 | N26 | E39 | .762 | 14630 | 5.1 | 4 | -F | 3 | C | | 54 | | F | Y5 |
| GRP63762 | 02 | 0423+3 | 0450 | 0518 | N27 | E37 | .752 | 14630 | 5.0 | 55 | -N | | | | | | | |
| | | | 0516 | | | | | | | | | | | | | | | |
| MITK | 02 | 0423 | 0450 | 0503 | N28 | E36 | .751 | 14630 | 4.9 | 40 | -F | | C | 0450 | 90 | 1.4 | E | |
| KOJA | 02 | 0426 | 0510 | 0518 | N26 | E37 | .745 | 14630 | 5.0 | 52 | 1N | | P | 0456 | 428 | 442.0 | CD | |
| CULG | 02 | 0512E | 0512 | 0615 | N26 | E38 | .753 | 14630 | 5.1 | 63D | -F | | P | 0526 | 140 | 1.8 | | |
| 763 MONT | 02 | 0826 | 0832 | 0840D | N26 | E35 | .728 | 14630 | 5.0 | 12D | -N | | C | 0832 | 180 | | | Y5 |
| 764 HTPR | 02 | 0845E | 0907 | 0916 | N27 | E35 | .735 | 14630 | 5.0 | 31D | -F | | C | 0907 | 20 | .3 | E | Y5 |
| GRP63765 | 02 | 0921+0 | 0921+3 | 0937 | N26 | E34 | .720 | 14630 | 4.9 | 16 | -N | | | | 60 | .9 | E | |
| ZURI | 02 | 0921 | 0921 | 0933 | N26 | E34 | .720 | 14630 | 4.9 | 12 | -N | | C | 0921 | 50 | .8 | | |
| HTPR | 02 | 0921 | 0924 | 0940 | N27 | E35 | .735 | 14630 | 5.0 | 19 | -N | | C | 0924 | 70 | 1.0 | E | |
| 766 HTPR | 02 | 1101 | 1102 | 1103 | N28 | E32 | .719 | 14630 | 4.9 | 2 | -F | | C | 1102 | 10 | .1 | D | Y5 |
| 767 HTPR | 02 | 1241 | 1250 | 1315 | N26 | E32 | .703 | 14630 | 4.9 | 34 | -N | | C | 1250 | 40 | .6 | | Y5 |
| | 02 | 1703 | 1732 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 02 | 1735 | 1909 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 02 | 2005 | 2340 | NO FLARE PATROL | | | | | | | | | | | | | | |
| GRP63768 | 03 | 1314+2 | 1318 | 1426 | N26 | E19 | .603 | 14630 | 5.0 | 72 | -N | | | | 80 | 1.0 | EK | |
| HTPR | 03 | 1314 | | 1317D | N27 | E19 | .614 | 14630 | 5.0 | 3D | -N | | C | 1317 | 60 | .8 | E | |
| MONT | 03 | 1316 | 1318 | 1426 | N26 | E20 | .610 | 14630 | 5.1 | 70 | -N | | C | 1318 | 110 | | EK | |
| | 03 | 1511 | 1529 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 03 | 1634 | 1645 | NO FLARE PATROL | | | | | | | | | | | | | | |
| 769 RAMY | 03 | 1703 | 1713 | 1725D | N26 | W17 | .590 | | 2.4 | 22D | -F | 3 | C | | 75 | | F | Y5 |
| 770 RAMY | 03 | 1946 | 1953 | 2005D | N26 | E15 | .578 | 14630 | 4.9 | 19D | -F | 3 | C | | 70 | | F | Y5 |
| | 03 | 2256 | 2319 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 03 | 2329 | 2340 | NO FLARE PATROL | | | | | | | | | | | | | | |

# Hα SOLAR FLARES

## FEBRUARY 1977

| OBSERVATORY | OBSERVED UT | | | | LOCATION | | | | | DURATION | IMPORTANCE | OBS. | | MEASUREMENTS | | | REMARKS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | APPROX | | CENTRAL DISTANCE | McMATH PLAGE REGION | CMP. DAY | | | CONG. | TYPE | TIME | MEAS. AREA | CORR AREA | | |
| | DATE 1977 FEB | START | MAX. PHASE | END | LAT. | MER. DIST. | | | | MIN. | | | | UT | Mill. of Disk | Sq. Deg. | | |
| | 03 | 2348 | 0023 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 04 | 0630 | 0631 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 04 | 0638 | 0650 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 04 | 0806 | 0830 | NO FLARE PATROL | | | | | | | | | | | | | | |
| 771 HTPR | 04 | 0842 | 0853 | 0915 | N25 | E01 | .519 | 14630 | 4.4 | 33 | -F | | C | 0853 | 20 | .2 | DH | Y5 |
| | 04 | 1054 | 1103 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 04 | 1402 | 1551 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 04 | 1635 | 1648 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 04 | 2045 | 2106 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 04 | 2141 | 2155 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 04 | 2200 | 2206 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 04 | 2236 | 2326 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 05 | 1020 | 1030 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 05 | 1555 | 1608 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 05 | 1807 | 1824 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 05 | 1938 | 1948 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 05 | 1956 | 2011 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 05 | 2100 | 2108 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 05 | 2147 | 2203 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 05 | 2205 | 2212 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 05 | 2245 | 2255 | NO FLARE PATROL | | | | | | | | | | | | | | |
| 772 MCMA | 06 | 1549 | 1554 | 1617 | N29 | W22 | .659 | 14630 | 5.0 | 28 | -N | | C | 1554 | 30 | .4 | D | Y5 |
| | 06 | 1856 | 2009 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 06 | 2306 | 2308 | NO FLARE PATROL | | | | | | | | | | | | | | |
| 773 HTPR | 07 | 1210 | 1214 | 1219 | S39 | E55 | .858 | 14637 | 11.6 | 9 | -F | | C | 1214 | 10 | .1 | | Y5 |
| 774 HTPR | 07 | 1556 | | 1603D | S39 | E53 | .845 | 14637 | 11.6 | 7D | -F | | C | 1603 | 20 | .2 | | Y5 |
| | 07 | 2020 | 2030 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 07 | 2222 | 2232 | NO FLARE PATROL | | | | | | | | | | | | | | |
| 775 VORO | 08 | 0155 | 0158 | 0211 | N12 | W50 | .799 | | 4.3 | 16 | ? B | | C | 0200 | 134 | 236.0 | CD | Y5 |
| | IMP-1 NO. MITK2 CULG1 | | | | | | | | | | | | | | | | | |
| 776 MITK | 08 | 0156 | 0157 | 0213 | N26 | W42 | .789 | 14630 | 4.9 | 17 | -B | | C | 0157 | 50 | .8 | EG | Y5 |
| 777 KHAR | 08 | 0930E | | 0935D | S40 | E46 | .799 | 14637 | 11.8 | 5D | -F | | P | | | | D | Y5 |
| 778 HTPR | 08 | 1058 | 1101 | 1111 | N26 | W43 | .797 | 14630 | 5.2 | 13 | -F | | C | 1101 | 20 | .3 | E | Y5 |
| 779 HTPR | 08 | 1059 | 1101 | 1104 | S39 | E44 | .780 | 14637 | 11.8 | 5 | -F | | C | 1101 | 10 | .1 | | Y5 |
| GRP63780 | 08 | 1114+1 | 1114+8 | 1125 | S40 | E44 | .785 | 14637 | 11.8 | 11 | -F | | | | 20 | .3 | D | |
| KHAR | 08 | 1114 | 1114 | 1123D | S39 | E44 | .780 | 14637 | 11.8 | 9D | -F | | P | | | | D | |
| HTPR | 08 | 1115 | 1118 | 1123 | S39 | E44 | .780 | 14637 | 11.8 | 8 | -N | | C | 1118 | 20 | .3 | | |
| MONT | 08 | 1117E | 1122 | 1126D | S41 | E45 | .797 | 14637 | 11.8 | 9D | -F | | C | 1122 | 20 | | D | |
| 781 HTPR | 08 | 1350E | | 1400 | S39 | E43 | .772 | 14637 | 11.8 | 10D | -F | | C | 1351 | 20 | .3 | E | Y5 |
| 782 HTPR | 08 | 1428E | | 1436D | S39 | E42 | .764 | 14637 | 11.8 | 8D | -F | | C | 1428 | 20 | .3 | E | Y5 |
| GRP63783 | 08 | 1453+0 | 1456+0 | 1506 | S39 | E44 | .780 | 14637 | 11.9 | 13 | -F | | | | 30 | .5 | EH | |
| MCMA | 08 | 1453E | 1456 | 1508 | S40 | E46 | .799 | 14637 | 12.1 | 15D | -N | | C | 1456 | 40 | .7 | EH | |
| HTPR | 08 | 1453 | 1456 | 1504 | S39 | E42 | .764 | 14637 | 11.8 | 11 | -F | | C | 1456 | 20 | .3 | E | |
| 784 MCMA | 08 | 1836E | | 1842D | S40 | E43 | .777 | 14637 | 12.0 | 6D | -N | | P | 1842 | 40 | .7 | E | Y5 |
| GRP63785 | 08 | 1858+3 | 1904+2 | 1915 | S39 | E40 | .749 | 14637 | 11.8 | 17 | -N | | | | 80 | 1.2 | F | |
| RAMY | 08 | 1858 | 1904 | 1917 | S38 | E40 | .743 | 14637 | 11.8 | 19 | -N | 3 | C | | 88 | | F | |
| PALE | 08 | 1901 | 1904 | 1912 | S40 | E40 | .755 | 14637 | 11.8 | 11 | -F | 3 | C | | 81 | | F | |
| RAMY | 08 | 1902E | 1906U | 1915D | S39 | E39 | .741 | 14637 | 11.7 | 13D | -N | 3 | V | | 70 | | F | |
| 786 CULG | 08 | 2207 | 2212 | 2240 | S40 | E45 | .792 | 14637 | 12.3 | 33 | -F | | C | 2216 | 80 | 1.1 | | Y5 |
| 787 HTPR | 09 | 0931 | 0935 | 0940 | S39 | E33 | .695 | 14637 | 11.9 | 9 | -F | | C | 0935 | 10 | .1 | | Y5 |
| | 09 | 1102 | 1115 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 09 | 1142 | 1159 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 09 | 1335 | 1340 | NO FLARE PATROL | | | | | | | | | | | | | | |

# Hα SOLAR FLARES

**FEBRUARY 1977**

| OBSERV-ATORY | OBSERVED UT | | | | LOCATION | | | | | DURA-TION | IMPOR-TANCE | OBS. | | MEASUREMENTS | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DATE 1977 FEB | START | MAX. PHASE | END | APPROX LAT. | APPROX LONG. DIST. | CENTRAL DISTANCE | McMATH PLAGE REGION | CMP. DAY | MIN. | | CONG. | TYPE | TIME UT | MEAS. AREA Mill. of Disk | CORR AREA Sq. Deg. | |
| GRP63788 | 09 | 1458 | 1504+1 | 1519 | N12 | E42 | .716 | 14638 | 12.8 | 21 | -N | | | | 110 | 1.6 | FSU |
| RAMY | 09 | 1458 | 1505 | 1521 | N12 | E42 | .716 | 14638 | 12.8 | 23 | -N | 3 | C | | 97 | | U S |
| RAMY | 09 | 1502E | 1504 | 1516 | N12 | E43 | .727 | 14638 | 12.9 | 14D | -N | 4 | V | | 127 | | F |
| 789 RAMY | 09 | 1700 | 1704 | 1710 | S40 | E30 | .681 | 14637 | 12.0 | 10 | -F | 3 | C | | 60 | | F Z Y5 |
| | 10 | 1415 | 1420 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 10 | 1425 | 1432 | NO FLARE PATROL | | | | | | | | | | | | | |
| 790 CATA | 10 | 1525E | 1525 | 1530D | N10 | E41 | .696 | | 13.7 | 5D | 1F | 1 | P | 1525 | 168 | 2.4 | Y5 |
| | 10 | 1545 | 1553 | NO FLARE PATROL | | | | | | | | | | | | | |
| 791 HCMA | 10 | 1833 | 1834 | 1838 | S41 | E20 | .626 | 14637 | 12.3 | 5 | -N | | C | 1834 | 20 | .3 | D Y5 |
| 792 HCMA | 10 | 1936 | 1939 | 1943 | S42 | E18 | .627 | 14637 | 12.2 | 7 | -F | | C | 1939 | 20 | .3 | DL Y5 |
| | 10 | 2016 | 2022 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 10 | 2034 | 2043 | NO FLARE PATROL | | | | | | | | | | | | | |
| 793 HTPR | 11 | 0741 | 0742 | 0753 | S40 | E12 | .574 | 14637 | 12.2 | 12 | -N | | C | 0742 | 80 | 1.0 | E Y5 |
| 794 HTPR | 11 | 0910 | 0915 | 0924 | S41 | E11 | .584 | 14637 | 12.2 | 14 | -F | | C | 0915 | 30 | .3 | E Y5 |
| GRP63795 | 11 | 1100+1 | 1104+1 | 1119 | S41 | E13 | .592 | 14637 | 12.4 | 19 | -N | | | | 80 | 1.0 | E |
| MONT | 11 | 1100 | 1104 | 1119 | S40 | E15 | .588 | 14637 | 12.6 | 19 | -N | | C | 1104 | 110 | | E |
| HTPR | 11 | 1101 | 1105 | 1119 | S41 | E11 | .584 | 14637 | 12.3 | 18 | -N | | C | 1105 | 70 | .8 | E |
| ZURI | 11 | 1101 | 1104 | 1117 | S41 | E12 | .588 | 14637 | 12.4 | 16 | -B | | C | 1104 | 70 | .8 | |
| | 11 | 1523 | 1800 | NO FLARE PATROL | | | | | | | | | | | | | |
| GRP63796 | 11 | 2125+2 | 2132+2 2140 | 2152D | S40 | W01 | .550 | 14637 | 11.8 | 27 | 1N | | | | 250 | 3.0 | J |
| CULG | 11 | 2125 | 2132 | 2240 | S42 | E05 | .583 | 14637 | 12.3 | 75 | -N | | C | 2133 | 130 | 1.3 | J |
| PALE | 11 | 2127 | 2140 | 2152 | S40 | W01 | .550 | 14637 | 11.8 | 25 | 1B | 3 | C | | 279 | | |
| PALE | 11 | 2127 | 2132 | 2152 | S40 | W01 | .550 | 14637 | 11.8 | 25 | -B | 3 | C | | 280 | | |
| RAMY | 11 | 2132E | 2134U | 2139D | S39 | W01 | .536 | 14637 | 11.8 | 7D | 1N | 2 | V | | 254 | | FDE |
| RAMY | 11 | 2132E | 2134U | 2139D | S40 | W04 | .553 | 14637 | 11.6 | 7D | 1N | 2 | C | | 254 | | FDE |
| GRP63797 | 11 | 2154+0 | 2155+0 | 2212 | S40 | W01 | .550 | 14637 | 11.8 | 18 | -F | | | | 30 | .4 | |
| PALE | 11 | 2154 | 2155 | 2212 | S40 | W01 | .550 | 14637 | 11.8 | 18 | -F | 3 | V | | 32 | | |
| PALE | 11 | 2154 | 2155 | 2212 | S40 | W01 | .550 | 14637 | 11.8 | 18 | -F | 3 | C | | 32 | | |
| 798 MITK | 12 | 0236 | 0239 | 0248 | N03 | E26 | .465 | 14643 | 14.1 | 12 | -N | | C | 0239 | 80 | .9 | D Y5 |
| 799 ATHN | 12 | 1154 | 1156 | 1201 | N01 | E19 | .350 | 14643 | 13.9 | 7 | -F | | V | 1156 | 21 | 43.0 | Y5 |
| 800 ATHN | 12 | 1154 | 1157 | 1205 | S40 | W10 | .567 | 14637 | 11.7 | 11 | -F | | V | 1157 | 33 | 70.0 | Y5 |
| 801 CATA | 12 | 1535E | 1545 | 1545D | S41 | W06 | .570 | 14637 | 12.2 | 10D | -N | 1 | P | 1545 | 56 | .7 | Y5 |
| | 12 | 2220 | 2223 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 12 | 2230 | 2245 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 12 | 2254 | 2309 | NO FLARE PATROL | | | | | | | | | | | | | |
| 802 BUCA | 13 | 0850 | | 0900 | N16 | W49 | .804 | 14647 | 9.7 | 10 | -N | | P | 0850 | 64 | 1.1 | E Y5 |
| 803 HTPR | 13 | 1204 | 1207 | 1212 | N23 | E08 | .511 | 14649 | 14.1 | 8 | -F | | C | 1207 | 20 | .2 | Y5 |
| 804 HTPR | 13 | 1321 | 1325 | 1336 | S40 | W20 | .613 | 14637 | 12.1 | 15 | -F | | C | 1325 | 10 | .1 | Y5 |
| | 13 | 1458 | 1604 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 13 | 1620 | 1621 | NO FLARE PATROL | | | | | | | | | | | | | |
| GRP63805 | 13 | 1708 | 1714+2 | 1727 | S41 | W13 | .590 | 14637 | 12.7 | 19 | -N | | | | 70 | .9 | F |
| RAMY | 13 | 1708 | 1716 | 1727 | S41 | W13 | .590 | 14637 | 12.7 | 19 | -N | 4 | C | | 52 | | F |
| RAMY | 13 | 1710E | 1714 | 1722D | S41 | W13 | .590 | 14637 | 12.7 | 12D | -N | 4 | V | | 95 | | F |
| | 13 | 1840 | 2054 | NO FLARE PATROL | | | | | | | | | | | | | |
| 806 CULG | 13 | 2150 | 2154 | 2209 | S42 | W15 | .611 | 14637 | 12.8 | 19 | -F | | C | 2157 | 60 | .6 | Y5 |
| | 13 | 2208 | 2214 | NO FLARE PATROL | | | | | | | | | | | | | |
| 807 MONT | 14 | 0853 | 0855 | 0902 | S41 | W22 | .635 | 14637 | 12.7 | 9 | -F | | C | 0855 | 60 | | E Y5 |
| 808 MONT | 14 | 1046 | 1050 | 1054 | S42 | W22 | .646 | 14637 | 12.8 | 8 | -F | | C | 1050 | 40 | | E Y5 |

# Hα SOLAR FLARES

## FEBRUARY 1977

| OBSERVATORY | OBSERVED UT | | | | LOCATION | | | | | DURATION | IMPORTANCE | OBS | | MEASUREMENTS | | | REMARKS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DATE 1977 FEB | START | MAX. PHASE | END | APPROX LAT. | APPROX MER. DIST. | CENTRAL DISTANCE | McMATH PLAGE REGION | CMP. DAY | MIN. | | CONC | TYPE | TIME UT | MEAS. AREA Mill. of Disk | CORR AREA Sq. Deg. | | |
| GRP63809 | 14 | 1407 | 1412+1 | 1429 | S41 | W27 | .667 | 14637 | 12.6 | 22 | -N | | | | 100 | 1.4 | | |
| RAMY | 14 | 1407 | 1413 | 1427 | S42 | W28 | .683 | 14637 | 12.5 | 20 | -N | 4 | C | | 79 | | FDE | |
| RAMY | 14 | 1409E | 1412 | 1430D | S41 | W27 | .667 | 14637 | 12.6 | 21D | -N | 4 | V | | 120 | | FDE | |
| | 14 | 1724 | 1736 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 14 | 1746 | 1804 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 14 | 1820 | 1904 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 14 | 1924 | 1927 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 14 | 1948 | 1956 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 14 | 2000 | 2017 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 14 | 2021 | 2039 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 14 | 2150 | 2155 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 14 | 2321 | 2346 | NO FLARE PATROL | | | | | | | | | | | | | | |
| 810 MONT | 15 | 0843 | 0845 | 0850 | S43 | W37 | .750 | 14637 | 12.6 | 7 | -F | | C | 0845 | 20 | | D | Y5 |
| 811 HTPR | 15 | 1603 | 1605 | 1610 | N22 | W25 | .613 | 14649 | 13.8 | 7 | -F | | C | 1605 | 10 | .1 | | Y5 |
| | 15 | 1626 | 1655 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 15 | 1705 | 1759 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 15 | 1802 | 1850 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 15 | 1859 | 2022 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 15 | 2110 | 2111 | NO FLARE PATROL | | | | | | | | | | | | | | |
| 812 CULG | 15 | 2254 | 2307 | 2355 | N26 | W90 | 1.001 | | 9.2 | 61 | 1F | | C | 2309 | 50 | | | Y5 |
| 813 MITK | 16 | 0225 | 0229 | 0234 | S43 | W40 | .770 | 14637 | 13.1 | 9 | -N | | C | 0229 | 50 | .8 | D | Y5 |
| 814 MITK | 16 | 0423 | 0428 | 0431D | S43 | W40 | .770 | 14637 | 13.2 | 8D | -B | | C | 0428 | 60 | 1.0 | D | Y5 |
| 815 MONT | 16 | 0803 | 0808 | 0814 | S42 | W50 | .832 | 14637 | 12.6 | 11 | -F | | C | 0808 | 60 | | E | Y5 |
| | 16 | 1317 | 1345 | NO FLARE PATROL | | | | | | | | | | | | | | |
| 816 CULG | 17 | 0145 | 0210 | 0240 | S45 | W60 | .980 | 14637 | 12.6 | 55 | -F | | C | 0210 | 30 | .6 | | Y5 |
| 817 PALE | 17 | 0308 | 0309 | 0311 | S41 | W57 | .873 | 14637 | 12.9 | 3 | -F | 3 | C | | 20 | | | Y5 |
| 818 PALE | 17 | 0335 | 0338 | 0351D | S41 | W58 | .879 | 14637 | 12.8 | 16D | -F | 3 | C | | 41 | | | Y5 |
| | 17 | 0605 | 0700 | NO FLARE PATROL | | | | | | | | | | | | | | |
| GRP63819 | 17 | 1339+1 | 1349+1 | 1432 | N19 | W54 | .859 | 14649 | 13.5 | 53 | -F | | | | 60 | 1.1 | E | |
| RAMY | 17 | 1339 | 1350 | 1418D | N19 | W54 | .859 | 14649 | 13.5 | 39D | -F | 4 | C | | 53 | | DE | |
| MCMA | 17 | 1340 | 1349 | 1432 | N20 | W54 | .862 | 14649 | 13.5 | 52 | -N | | C | 1349 | 80 | 1.7 | E | |
| GRP63820 | 17 | 1528+3 | 1530<br>1548+6 | 1605 | S42 | W65 | .920 | 14637 | 12.8 | 37 | 1N | | | | 130 | | EHL | |
| MCMA | 17 | 1528 | 1530 | 1539 | S42 | W67 | .930 | 14637 | 12.6 | 11 | -F | | C | 1530 | 70 | 1.8 | EH | |
| RAMY | 17 | 1531 | 1554 | 1605D | S42 | W65 | .920 | 14637 | 12.8 | 34D | 1N | 3 | C | | 132 | | DE | |
| MCMA | 17 | 1540 | 1548 | 1605 | S42 | W67 | .930 | 14637 | 12.6 | 25 | -N | | C | 1548 | 60 | 1.6 | EHL | |
| RAMY | 17 | 1547E | 1552 | 1600D | S42 | W62 | .904 | 14637 | 13.0 | 13D | -N | 4 | V | | 144 | | DE | |
| | 17 | 2221 | 2227 | NO FLARE PATROL | | | | | | | | | | | | | | |
| 821 VORO | 18 | 0345E | 0346 | 0348D | S00 | W70 | .941 | | 12.9 | 3D | -N | | C | 0346 | 36 | .4 | D | Y5 |
| | 18 | 1001 | 1004 | NO FLARE PATROL | | | | | | | | | | | | | | |
| GRP63822 | 18 | 2341+4 | 2350+0<br>2359 | 0020 | N20 | W70 | .961 | 14649 | 13.7 | 40 | 1N | | | | | | E | |
| CULG | 19 | 0020E | | 0020 | N19 | W70 | .960 | 14649 | 13.8 | | 1F | | C | | 70 | 2.1 | | |
| CULG | 18 | 2340 | 2350 | 2354D | N19 | W70 | .960 | 14649 | 13.7 | 14D | 1F | | C | 2354 | 70 | 2.1 | | |
| MANI | 18 | 2344 | 2350 | 2358 | N23 | W77 | .987 | 14649 | 13.2 | 14 | -N | 2 | | 2350 | 50 | 1.3 | | |
| MITK | 18 | 2357E | 2359 | 0056 | N20 | W67 | .946 | 14649 | 14.0 | 59D | 1N | | C | 2359 | 130 | | E | |
| | 19 | 0507 | 0513 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 19 | 1000 | 1025 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 19 | 1135 | 1150 | NO FLARE PATROL | | | | | | | | | | | | | | |
| | 19 | 1310 | 1320 | NO FLARE PATROL | | | | | | | | | | | | | | |
| 823 VORO | 20<br>IMP.1 | 0147E<br>NO | 0149<br>PALE1 | 0205D | S15 | E08 | .194 | 14651 | 20.7 | 18D | ?N | | C | 0153 | 296 | 3.0 | | Y5 |
| | 20 | 0228 | 0302 | NO FLARE PATROL | | | | | | | | | | | | | | |
| 824 VORO | 20 | 0242E | 0258 | 0355D | S14 | E07 | .170 | 14651 | 20.6 | 73D | 1N | | C | 0304 | 233 | 2.4 | | Y5 |

# Hα SOLAR FLARES

## FEBRUARY 1977

| OBSERVATORY | OBSERVED UT | | | | LOCATION | | | | | DURATION | IMPORTANCE | OBS. | | MEASUREMENTS | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DATE FEB | START | MAX. PHASE | END | APPROX LAT. | APPROX MER. DIST. | CENTRAL DISTANCE | McMATH PLAGE REGION | CMR DAY | MIN. | | CONF. | TYPE | TIME UT | MEAS. AREA Mill. of Disk | CORR AREA Sq. Deg. | |
| | 20 | 0307 | 0316 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 20 | 0345 | 0349 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 20 | 0413 | 0421 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 20 | 1531 | 1535 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 20 | 1605 | 1723 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 20 | 1802 | 1808 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 20 | 2017 | 2120 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 20 | 2201 | 2310 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 21 | 0053 | 0104 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 21 | 0150 | 0230 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 21 | 1346 | 1323 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 21 | 1607 | 1621 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 21 | 1626 | 1706 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 21 | 2306 | 2308 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 22 | 1650 | 1804 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 22 | 2011 | 2236 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 22 | 2252 | 2332 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 22 | 2334 | 2346 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 23 | 1613 | 1623 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 23 | 1633 | 1759 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 23 | 1814 | 1845 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 23 | 1934 | 2035 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 23 | 2105 | 2128 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 23 | 2220 | 2235 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 0530 | 0532 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 0535 | 0536 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 1210 | 1530 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 1617 | 1826 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 1831 | 2041 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 2046 | 2111 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 24 | 2141 | 2202 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 25 | 1940 | 1945 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 26 | 2056 | 2106 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 26 | 2115 | 2132 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 26 | 2310 | 2325 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 27 | 1300 | 1350 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 27 | 1400 | 1430 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 27 | 1435 | 1500 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 27 | 1505 | 1751 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 28 | 2004 | 2027 | NO FLARE PATROL | | | | | | | | | | | | | |
| | 28 | 2225 | 2226 | NO FLARE PATROL | | | | | | | | | | | | | |

"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium $D_3$ in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

**FEBRUARY 1977**

### DAILY FLARE INDICES
Includes all Flares

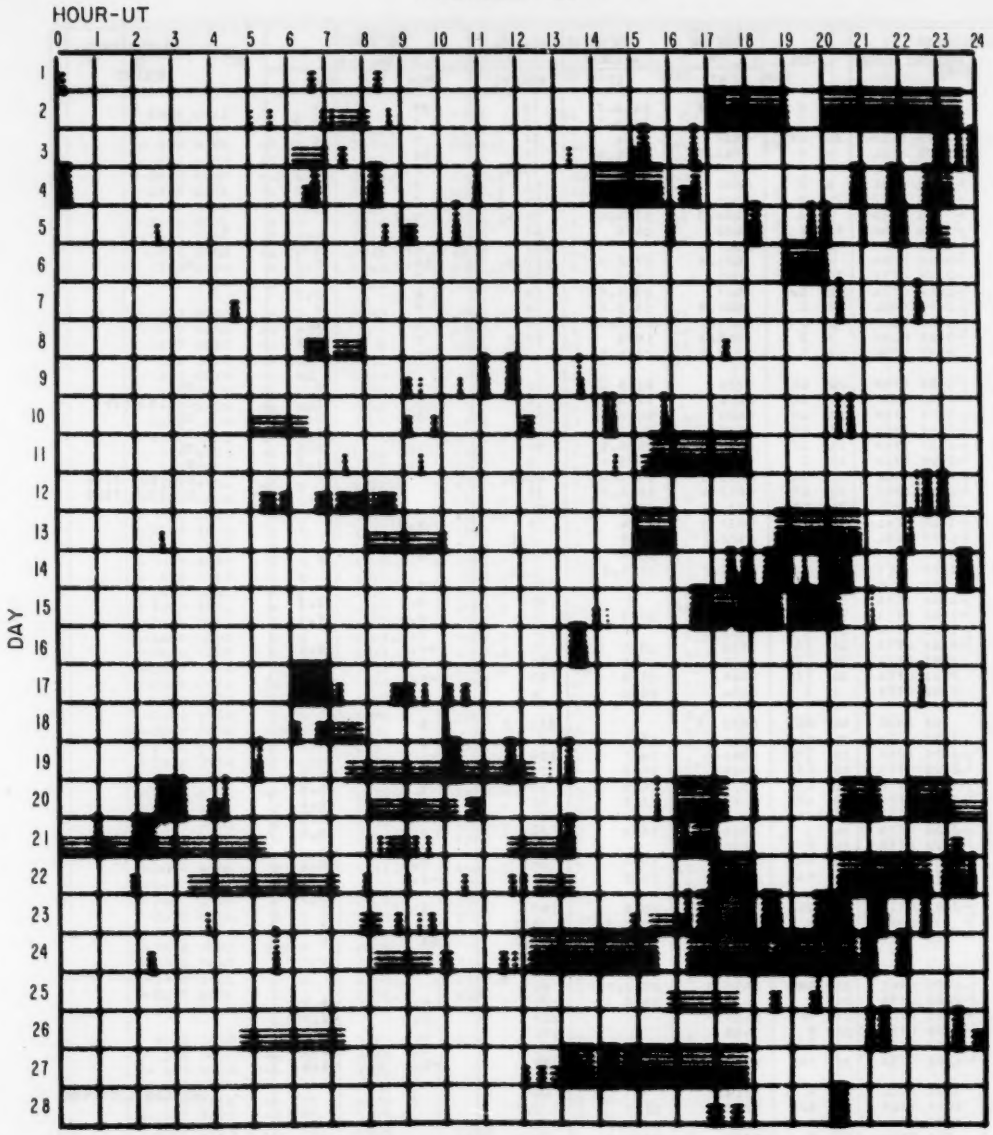
| Date | Flare Index | HR. OBS. | Date | Flare Index | HR. OBS. | Date | Flare Index | HR. OBS. |
|---|---|---|---|---|---|---|---|---|
| 770201 | 20.32 | 24.0 | 770210 | 17.22 | 23.4 | 770219 | 0.00 | 23.1 |
| 770202 | 22.04 | 18.4 | 770211 | 47.92 | 21.4 | 770220 | 25.63 | 19.5 |
| 770203 | 12.15 | 22.4 | 770212 | 15.58 | 23.5 | 770221 | 0.00 | 22.0 |
| 770204 | 3.61 | 19.7 | 770213 | 16.76 | 20.6 | 770222 | 0.00 | 19.5 |
| 770205 | 0.00 | 22.2 | 770214 | 12.25 | 21.5 | 770223 | 0.00 | 20.2 |
| 770206 | 1.96 | 22.8 | 770215 | 9.94 | 20.4 | 770224 | 0.00 | 15.5 |
| 770207 | 2.76 | 23.7 | 770216 | 5.78 | 23.5 | 770225 | 0.00 | 23.9 |
| 770208 | 19.26 | 24.0 | 770217 | 13.52 | 23.0 | 770226 | 0.00 | 23.3 |
| 770209 | 10.19 | 23.4 | 770218 | 4.22 | 24.0 | 770227 | 0.00 | 19.5 |
| | | | | | | 770228 | 0.00 | 23.6 |

When no Flare Index is given, it is 0 for that day.

# INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

**FEBRUARY 1977**




Observatories included in total patrol:

| | | | | |
|---|---|---|---|---|
| Athenes | Herstmonceux | Kodaikanal | Meudon | Tashkent |
| Bucharest | Hurbanovo | Locarno | Mitaka | Tehran |
| Catania | Istanboul | Lvov | Monte Mario | Upice |
| Culgoora | Kharkov | Manila | Palehua | Voroshilov |
| Haute Provence | Kiev | McMath-Hulbert | Ramey | Wendelstein |
| | | | | Zürich |

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

# SOLAR RADIO EMISSION
## OUTSTANDING OCCURRENCES

**FEBRUARY 1977**

| FEB 1977 | FREQUENCY | STATION | TYPE | STARTING TIME UT | TIME OF MAXIMUM UT | DURATION MINUTES | FLUX DENSITY $10^{-22}$ Wm$^{-2}$ Hz$^{-1}$ PEAK | FLUX DENSITY MEAN | INT | POLARIZATION OR REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1000 | TYKW | 45 C | 0447.7 | 0448.7 | 2 | 27 | 4 | | |
| | 2000 | TYKW | 45 C | 0448 | 0448.7 | 2 | 1.2 | 0.3 | | OL |
| | 3100 | CRIM | 21 GRF | 0800 | 0808 | 32 | 5 | 2 | | |
| | 9500 | BERL | 4 F | 0803.5 | 0805.6 | 7 | 28 | | | |
| | 3000 | BERL | 4 F | 0805.5 | 0807.5 | 9.5 | 7.4 | | | |
| | 1470 | BERL | 8 S | 0806 | 0808.5 | 11 | 3.4 | | | |
| | 3100 | CRIM | 24 R | 1106 | 1136 | 114 D | 3 | | | |
| | 550 | KIEV | 5 S | 1134.3 | 1134.4 | 0.4 | 1.3 | | | |
| | 18 | MCMA | 41 F | 1420 | 1434 | 57 | | | 1 | |
| | 2800 | OTTA | 20 GRF | 1517 | | 180 | 1.2 | 0.7 | | |
| | 9400 | HUAN | 3 S | 1628.5 | 1752.5 | 122.5 | 14.4 | 5.7 | | R |
| | 2800 | OTTA | 21 GRF | 1902 | 1920 | 75 | 2.4 | 1.2 | | |
| | 2800 | OTTA | 2 S/F | 1907 | 1911.5 | 9 | 6 | 2.2 | | |
| | 2695 | BOUL | 45 C | 1908.5 | 1912.5 | 8 | 7 | 2 | | |
| | 1420 | BOUL | 45 C | 1909.5 | 1913.5 | 5 | 3 | 1 | | |
| | 9400 | HUAN | 3 S | 1919.3 | 1928 | 49.2 | 8 | 4.4 | | |
| | 4995 | BOUL | 45 C | 2323.5 | 2324.5 | 2.5 | 20 | 6 | | |
| 2 | 9400 | TYKW | 20 GRF | 0220 | 0235 | 50 | 6 | 3 | | OR |
| | 3750 | TYKW | 20 GRF | 0220 | 0234 | 50 | 3 | 1 | | OR,103052F |
| | 9400 | TYKW | 20 GRF | 0420 | 0455 | 130 | 8 | 3 | | OR |
| | 3750 | TYKW | 20 GRF | 0420 | 0530 | 130 | 5 | 2 | | OR |
| | 2000 | TYKW | 21 GRF | 0445 | 0505.5 | 90 | 1.5 | 0.8 | | OL |
| | 2000 | TYKW | 45 C | 0523 | 0525.4 | 6 | 2.6 | 1.3 | | OL |
| | 9100 | ARCE | 22 GRF | 0805.3 | 0834.9 | 40.5 | | | | DUBIOUS TIME |
| | 1420 | ARCE | 20 GRF | 0812.4 | 0824.7 | 32 | | | | DUBIOUS TIME |
| | 9100 | ARCE | 22 GRF | 0921.8 | 0924.5 | 45 | | | | |
| | 3000 | BERL | 4 F | 0922.5 | 0924 | 3 | 3.9 | | | |
| | 1470 | BERL | 4 F | 0922.5 | 0923 | 2.5 | 5.8 | | | |
| | 3100 | CRIM | 1 S | 0923 | 0924 | 3 | 5 | 2 | | |
| | 1420 | ARCE | 2 S/F | 0923.7 | 0924.8 | 1.4 | | | | |
| | 260 | ONDR | 43 NS | 1050 | | 218 D | 10 | | | |
| | 2800 | OTTA | 27 RF | 1430 | | 45 | 0.8 | 0.7 | | |
| | 2800 | OTTA | 24 R | 1430 | 1438 | 8 | 0.8 | 0.4 | | |
| | 2800 | OTTA | 24P R | 1438 | | 32 | 0.8 | | | |
| | 2800 | OTTA | 26 FAL | 1510 | 1515 | 5 | -0.8 | -0.4 | | |
| | 2800 | OTTA | 22 GRF | 1655 | 1730 | 150 | 2 | 0.9 | | |
| | 2800 | OTTA | 26 FAL | 2005 | 2025 | 20 | -1.2 | -0.6 | | |
| | 2800 | OTTA | 1 S | 2054 | 2056 | 4 | 1 | 0.5 | | |
| 3 | 260 | ONDR | 44 NS | 0803 E | | 379 D | 8 | | | |
| | 3100 | CRIM | 26 FAL | 0916 | 1046 | | 6 | | | |
| | 1420 | ARCE | 20 GRF | 1318.5 | 1451 | 126 | | | | |
| | 2800 | OTTA | 26 FAL | 1405 | 1425 | 20 | -1.2 | -0.6 | | |
| | 2800 | OTTA | 22 GRF | 1525 | 1625 | 90 | 1 | 0.5 | | |
| | 2800 | OTTA | 20 GRF | 1655 | 1711 | 50 | 2.2 | 1.1 | | |
| | 2800 | OTTA | 27AFRF | 1810 | | 135 | 0.8 | 0.7 | | |
| | 2800 | OTTA | 24 R | 1810 | 1830 | 20 | 0.8 | 0.4 | | |
| | 2800 | OTTA | 24P R | 1830 | | 107 | 0.8 | | | |
| | 2800 | OTTA | 20 GRF | 1946 | 1954 | 24 | 0.8 | 0.5 | | |
| | 2800 | OTTA | 26 FAL | 2017 | 2025 | 8 | -0.8 | -0.4 | | |
| 4 | 3100 | CRIM | 20 GRF | 0851 | 1026 | 189 | 3 | 1 | | |
| | 930 | BORD | 46 C | 0917 | 0917.1 | 0.3 | 41 | 2 | | |
| | 930 | BORD | 46 C | 0940.9 | 0941 | 0.2 | 50 | 2 | | |
| 6 | 9100 | ARCE | 22 GRF | 1307.7 | 1432.7 | 153 | | | | RECORD DISTURBE |
| | 1420 | ARCE | 22 GRF | 1411.3 | 1508.7 | 84 | | | | |
| | 2800 | OTTA | 24 R | 1415 | 1440 | 25 | 0.8 | 0.4 | | |
| | 2800 | OTTA | 27A RF | 1415 | | 220 | 0.8 | 0.7 | | |
| | 2800 | OTTA | 24P R | 1440 | | 170 | 0.8 | | | |
| | 2800 | OTTA | 20 GRF | 1543 | 1600 | 70 | 0.8 | 0.4 | | |
| | 2800 | OTTA | 26 FAL | 1730 | 1755 | 25 | -0.8 | -0.4 | | |
| 7 | 9100 | ARCE | 24 R | 1119.5 | | 44 | | | | RECORD DISTURBE |
| | 1420 | ARCE | 2 S/F | 1247.7 | 1248 | 0.7 | | | | |
| | 1420 | ARCE | 3 S | 1250.7 | 1250.8 | 1 | | | | |
| | 700 | SYDN | 40 F | 2226 | 2226.2 | 1.1 | | | | |
| | 700 | SYDN | 40 F | 2238.3 | 2242.1 | 2.9 | | | | |
| 8 | 700 | SYDN | 40 F | 0138.3 | 0138.4 | 0.2 | | | | |
| | 700 | SYDN | 40 F | 0143.2 | 0143.6 | 2.1 | | | | |
| | 1400 | SYDN | 40 F | 0143.4 | 0143.7 | 1.8 | | | | |
| | 3750 | TYKW | 5 S | 0156 | 0156.4 | 1.5 | 5 | 2 | | OR,285071F |
| | 2000 | TYKW | 5 S | 0156 | 0156.6 | 1.5 | 2.1 | 0.8 | | OL |
| | 2300 | TYKW | 45 C | 0436 | 0436.7 | 1.5 | 4.1 | 1.8 | | 65L |
| | 1000 | TYKW | 45 C | 0436 | 0436.7 | 1.5 | 1.6 | 0.6 | | |
| | 3100 | CRIM | 20 GRF | 0830 | 0910 | 76 | 5 | 2 | | |
| | 3100 | CRIM | 24 R | 1021 | 1216 | | 5 | | | |
| | 2800 | OTTA | 22 GRF | 1400 | | 80 | 1.2 | 0.7 | | |
| | 1420 | ARCE | 4 S/F | 1451 | 1452.4 | 4 | | | | |
| | 2800 | OTTA | 20 GRF | 1530 | 1630 | 80 | 1.2 | 0.6 | | |
| | 2800 | OTTA | 240FR | 1658 | 1713 | 15 | 0.8 | 0.4 | | |
| | 2800 | OTTA | 24P R | 1713 | | 200 D | 0.8 | | | |

# SOLAR RADIO EMISSION
# OUTSTANDING OCCURRENCES

**FEBRUARY 1977**

| FEB 1977 | FREQUENCY | STATION | TYPE | | STARTING TIME UT | TIME OF MAXIMUM UT | DURATION MINUTES | FLUX DENSITY $10^{-22}$ Wm$^{-2}$ Hz$^{-1}$ PEAK | FLUX DENSITY $10^{-22}$ Wm$^{-2}$ Hz$^{-1}$ MEAN | INT | POLARIZATION OR REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2800 | OTTA | 22 | GRF | 1820 | 1905 | 190 | 2 | 1 | | |
| | 500 | HIRA | 5 | S | 2209.3 | 2209.6 | 1 | 35 | 15 | | MR |
| | 200 | HIRA | 45 | C | 2209.4 | 2209.6 | 0.6 | 780 | 250 | | MR |
| | 100 | HIRA | 45 | C | 2209.5 | | 0.5 | 120 D | | | MRML |
| | 2695 | PENT | 46F | C | 2209.5 | 2209.8 | 2.5 | 49 | 9.8 | | |
| | 1420 | BOUL | 8 | S | 2209 | 2209.5 | 2.5 | 57 | 22 | | |
| | 1420 | BOUL | 30 | PBI | 2212 | 2212.5 | 2 | 2 | 1 | | |
| | 2695 | BOUL | 8 | S | 2210 | 2210.5 | 1 | 57 | 20 | | |
| | 2695 | BOUL | 30 | PBI | 2211.5 | 2212 | 1.5 | 9 | 3 | | |
| | 700 | SYDN | 40 | F | 2241 | 2242 | 1.1 | | | | |
| | 700 | SYDN | 4 | S | 2243.8 | 2244.2 | 0.5 | | | | |
| | 700 | SYDN | 40 | F | 2304 | 2304.2 | 0.3 | | | | |
| 9 | 207 | VORO | 6 | S | 0243 | 0243.2 | 1 | 26 | | | |
| | 207 | VORO | 29 | PBI | | 0244 | 6 | 10 | | | |
| | 207 | VORO | 43 | NS | 0330 | 0442 | 90 | 12 | 8 | | |
| | 260 | ONDR | 44 | NS | 0815 E | | 369 D | 13 | | | |
| | 240 | DWIN | 44 | NS | 1014 E | | 261 D | | 2 | | |
| | 169 | DWIN | 44 | NS | 1014 E | | 261 D | | 2 | | |
| | 160 | DWIN | 44 | NS | 1014 E | | 261 D | | 2 | | |
| | 3100 | CRIM | 20 | GRF | 0835 | 0839 | 67 | 3 | 1 | | |
| | 9100 | ARCE | 20 | GRF | 1240.9 | 1317.4 | 103 | | | | |
| | 930 | BORD | 46 | C | 1308 | 1308.1 | 0.4 | 27 | 2 | | |
| | 808 | ONDR | 8 | S | 1308 | 1308 | 0.3 | 42 | | | |
| | 1420 | ARCE | 45 | C | 1315.8 | 1317.3 | 3.5 | | | | |
| | 536 | ONDR | 4 | S/F | 1316.5 | 1317.2 | 1.5 | 7 | | | |
| | 808 | ONDR | 3 | S | 1316.5 | 1317.2 | 1.5 | 18 | | | |
| | 2695 | SGMR | 1 | S | 1316.7 | 1317 | 1.3 | 9.5 | 2.8 | | |
| | 4995 | SGMR | 1 | S | 1316.8 | 1317.1 | 2.3 | 4.8 | 1.4 | | |
| | 930 | BORD | 3 | S | 1316.8 | 1317.2 | 1.2 | 13 | 3 | | |
| | 550 | KIEV | 3 | S | 1316.9 | 1317.5 | 1.2 | 7 | | | |
| | 1470 | BERL | 4 | F | 1317 | 1317.5 | 1.5 | 6.4 | 3 | | |
| | 3000 | BERL | 4 | F | 1317 | 1317.2 | 1.3 | 10 | 3.7 | | |
| | 9500 | BERL | 2 | | 1317.1 | 1317.4 | 1.4 | 7 | | | |
| | 8800 | SGMR | 1 | S | 1317.2 | 1317.3 | .4 | 7.2 | 2.2 | | |
| | 7000 | SAOP | 1 | S | 1317.4 | 1317.8 | 1.6 | 8.3 | 3.9 | | |
| | 2800 | OTTA | 1 | S | 1317 | 1317.3 | 2.5 | 6.8 | 1.8 | | |
| | 2800 | OTTA | 24 | R | 1450 | 1530 | 40 | 1.2 | 0.5 | | |
| | 2800 | OTTA | 27A | RF | 1450 | | 235 | 1.2 | 1 | | |
| | 2800 | OTTA | 1 | S | 1456 | 1504 | 10 | 0.8 | 0.6 | | |
| | 2800 | OTTA | 24P | R | 1530 | | 180 | 1.2 | | | |
| | 2800 | OTTA | 20 | GRF | 1537 | 1541 | 12 | 0.8 | 0.4 | | |
| | 2800 | OTTA | 22 | GRF | 1601 | 1625 | 30 | 0.8 | 0.4 | | |
| | 2800 | OTTA | 20 | GRF | 1700 | 1702.3 | 15 | 1.8 | 0.9 | | |
| | 1420 | BOUL | 45 | C | 1736.5 | 1738.5 | 2.5 | 4 | 1 | | |
| | 2800 | OTTA | 2 | S/F | 1737 | 1738.7 | 2.2 | 2 | 1 | | |
| | 1420 | BOUL | 3 | S | 1746 | 1746.5 | 2 | 3 | 1 | | |
| | 2800 | OTTA | 26 | FAL | 1830 | 1840 | 15 | -1.2 | -0.6 | | |
| | 2800 | OTTA | 32A | ABS | 1910 | 1915 | 20 | -0.8 | -0.4 | | |
| | 4995 | BOUL | 3 | S | 1911.5 | 1913.5 | 7 | 19 | 6 | | |
| | 1420 | BOUL | 3 | S | 1920.5 | 1922 | 2.5 | 4 | 1 | | |
| | 2800 | OTTA | 2 | S/F | 1920.5 | 1921 | 2.5 | 2 | 1.1 | | |
| | 2695 | BOUL | 3 | S | 1922 | 1923 | 4.5 | 3 | 1 | | |
| | 2800 | OTTA | 240 | R | 2025 | 2036 | 11 | 1.2 | 0.6 | | |
| | 2695 | PENT | 24P | R | 2036 | | 120 D | 1.2 | | | |
| | 2695 | PENT | 2 | S/F | 2149.5 | 2151.2 | 2.5 | 2 | 1 | | |
| | 1420 | BOUL | 1 | S | 2149.5 | 2150.5 | 2 | 1 | | | |
| | 2695 | BOUL | 3 | S | 2150.5 | 2152 | 3 | 2 | 1 | | |
| | 2000 | TYKW | 5 | S | 2309 | 2309.4 | 1 | 1.8 | 0.8 | | 70L |
| 10 | 3100 | CRIM | 20 | GRF | 0620 | 0623 | 23 | 1 | 0.3 | | |
| | 260 | ONDR | 44 | NS | 0810 E | | 364 D | 26 | | | |
| | 169 | DWIN | 44 | NS | 1031 E | | 222 D | | 2 | | |
| | 160 | DWIN | 44 | NS | 1031 E | | 222 D | | 2 | | |
| | 240 | DWIN | 44 | NS | 1031 E | | 222 D | | 2 | | |
| | 127 | TORN | 43 | NS | 1115.5 | | 210 D | | | | |
| | 3100 | CRIM | 26 | FAL | 0839 | 0858 | | 3 | | | |
| | 3100 | CRIM | 24 | R | 0931 | 1104 | | 4 | | | |
| | 2800 | OTTA | 21 | GRF | 2056 | 2105 | 65 | 3.6 | 1.8 | | |
| | 2800 | OTTA | 1 | S | 2057 | 2057.8 | 1.5 | 1 | 0.5 | | |
| | 2695 | BOUL | 24 | R | 2100 | 2107.5 | 95 | 4 | 1 | | |
| | 1420 | BOUL | 4 | SF | 2106.5 | 2108.5 | 3 | 4 | 1 | | |
| 11 | 127 | TORN | 44 | NS | 0700 E | 1101.5 | 460 D | 105 | | | |
| | 260 | ONDR | 44 | NS | 0810 E | | 380 D | 205 | | | |
| | 160 | DWIN | 44 | NS | 0942 E | | 304 D | | 5 | | |
| | 240 | DWIN | 44 | NS | 0942 E | | 304 D | | 4 | | |
| | 169 | DWIN | 44 | NS | 0942 E | | 304 D | | 6 | | |
| | 1415 | MANI | 4 | S/F | 0730 | 0740.6 | 16 | 57 | 20.7 | | |
| | 3100 | CRIM | 3 | S | 0739 | 0740 | 4 | 16 | 5 | | |
| | 1470 | BERL | 2 | F | 0739 | 0740.5 | 3.5 | 53 | | | |
| | 3000 | BERL | 4 | F | 0739 | 0740.4 | 3 | 11 | | | |
| | 9500 | BERL | 3 | S | 0739 | 0740.3 | 3 | 18 | | | |
| | 221 | ABST | 6 | S | 0739.8 | 0740.2 | 1.5 | 13 | 6 | | |
| | 200 | HIRA | 45 | C | 0740 | 0740.3 | 1.2 | 150 | 20 | | O |

# SOLAR RADIO EMISSION
## OUTSTANDING OCCURRENCES
### FEBRUARY 1977

| FEB 1977 | FREQUENCY | STATION | TYPE | STARTING TIME UT | TIME OF MAXIMUM UT | DURATION MINUTES | FLUX DENSITY $10^{-22}$ Wm$^{-2}$ Hz$^{-1}$ PEAK | FLUX DENSITY MEAN | INT | POLARIZATION OR REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4995 | MANI | 4 S/F | 0740 | 0740.7 | 1.8 | 30.4 | 13.7 | | |
| | 606 | MANI | 4 S/F | 0740 | 0740.7 | 16 | 57 | 16 | | |
| | 8800 | MANI | 4 S/F | 0740 | 0740.7 | 3 | 31.1 | 10.4 | | |
| | 2695 | MANI | 4 S/F | 0740 | 0740.7 | 2 | 15.6 | 7.1 | | |
| | 930 | BORD | 46 C | 0740 | 0740.8 | 2 | 77 | 6 | | |
| | 500 | HIRA | 45 C | 0740.1 | 0740.8 | 1.5 | 120 | 80 | | HR |
| | 100 | HIRA | 45 C | 0740.1 | 0740.3 | 0.9 | 980 | 150 | | O |
| | 237 | TRST | 41 F | 0740.1 | 0740.2 | 0.7 | 660 | | | O |
| | 9100 | ARCE | 3 S | 0740.2 | 0740.8 | 2.2 | | | | |
| | 1000 | TYKW | 5 S | 0740 | 0740.8 | 3 | 23 | 7 | | |
| | 2300 | TYKW | 5 S | 0740 | 0740.7 | 3 | 27 | 7 | | 45L |
| | 3750 | TYKW | 5 S | 0740 | 0740.7 | 2 | 17 | 6 | | 15L |
| | 550 | KIEV | 3 S | 0740 | | 2.5 | 33 | | | |
| | 3100 | CRIM | 1 S | 0910 | 0911 | 2 | 4 | 1 | | |
| | 550 | KIEV | 20 GRF | 0932.2 | | 8.2 | 2.6 | | | |
| | 3100 | CRIM | 21 GRF | 1024 | 1025 | | 2 | | | |
| | 550 | KIEV | 3 S | 1100.5 | 1101.6 | 2.7 | 19 | | | |
| | 226 | HARS | 6 S | 1100.7 | 1101.5 | 2.1 | 400 D | 175 D | | |
| | 930 | BORD | 3 S | 1100.8 | 1101.7 | 1.8 | 27 | 4 | | |
| | 3000 | BERL | 1 S | 1101 | 1101.3 | 1 | 4.6 | | | |
| | 1470 | BERL | 1 S | 1101 | 1101.5 | 1 | 2 | | | |
| | 237 | TRST | 41 F | 1101.1 | 1103.4 | 0.5 | 4000 D | | | O |
| | 408 | TRST | 45 C | 1101.2 | 1101.3 | 1.4 | 45 | 9 | | |
| | 536 | ONDR | 4 S/F | 1200.7 | 1201.5 | 2 | 22 | 5.6 | | |
| | 808 | ONDR | 4 S/F | 1200.8 | 1201.6 | 2 | 55 | 16 | | |
| | 237 | TRST | 41 F | 1210.5 | 1210.5 | 0.1 | 1800 | | | O |
| | 2800 | OTTA | 27A RF | 1410 | | 275 | 1.4 | 1.2 | | |
| | 2800 | OTTA | 24 R | 1410 | 1500 | 50 | 1.4 | 0.9 | | |
| | 2800 | OTTA | 24P R | 1500 | | 215 | 1.4 | | | |
| | 2800 | OTTA | 20 GRF | 1659 | 1715 | 40 | 1.6 | 0.8 | | |
| | 9400 | HUAN | 3 S | 1701.7 | 1731.3 | 34.7 | 9.8 | 4 | | |
| | 9400 | HUAN | 3 S | 1741.9 | 1749.1 | 19.5 | 13.1 | 6.9 | | |
| | 2800 | OTTA | 26 FAL | 1835 | 1845 | 10 | -1.4 | -0.6 | | |
| | 2800 | OTTA | 22 GRF | 1848 | 1955 | 95 | 1.6 | 0.8 | | |
| | 2800 | OTTA | 28 PRE | 2055 | | 31 | 1.2 | 1 | | |
| | 2695 | PENT | 29 PBI | 2136 | 2136 | 105 | 6.8 | 3.9 | | |
| | 4995 | BOUL | 45 C | 2125 | 2130.5 | 20.5 | 45 | 15 | | |
| | 1420 | BOUL | 45 C | 2126.5 | 2132 | 14 | 7 | 2 | | |
| | 9400 | HUAN | 3 S | 2126.7 | 2131 | 36 | 32.6 | 9.9 | | R |
| | 4995 | SGMR | 22 GRF | 2126.8 | 2131.1 | 13.2 | 46 | 18.4 | | SWF |
| | 2800 | OTTA | 4 S/F | 2126 | 2132 | 10 | 30 | 12 | | |
| | 2695 | SGMR | 4 S/F | 2127.1 | 2131.5 | 17.9 | 31.1 | 12.4 | | SWF |
| | 2695 | BOUL | 45 C | 2127 | 2133 | 22 | 26 | 9 | | |
| | 245 | SGMR | 8 S | 2130 | 2134.2 | 7 | 46.6 | 4.7 | | SWF |
| | 8800 | SGMR | 4 S/F | 2130.6 | 2131.1 | 3.2 | 18.9 | 7.6 | | SWF |
| | 200 | HIRA | 44 NS | 2135 E | 0135 | 650 D | 50 | 25 | | SR |
| | 207 | VORO | 44 NS | 2300 | 0145 | 360 | 31 | 20 | | |
| 12 | 221 | ABST | 44 NS | 0500 | 0643 | 240 | 12 | | | |
| | 127 | TORN | 44 NS | 0700 E | 1301.2 | 460 D | 32 | | | |
| | 260 | ONDR | 44 NS | 0740 E | | 388 D | 47 | 6 | | |
| | 245 | SGMR | 44 NS | 1149 E | 1759.3 | 618 D | 187.9 | | | |
| | 200 | HIRA | 44 NS | 2135 E | 2320 | 650 D | 30 | 15 | | SR |
| | 207 | VORO | 44 NS | 2300 | 2320 | 360 | 22 | 15 | | |
| | 221 | ABST | 6 S | 0726.5 | 0727 | 2 | 28 | 10 | | |
| | 3100 | CRIM | 25 R | 0733 | 1200 | 277 D | 6 | | | |
| | 221 | ABST | 6 S | 0744.8 | 0745.2 | 1.5 | 28 | 16 | | |
| | 550 | KIEV | 8 S | 0808.7 | 0809.2 | 0.5 | 9 | | | |
| | 1420 | ARCE | 2 S/F | 0809.1 | 0809.2 | 0.8 | | | | RECORD DISTURBE |
| | 1420 | ARCE | 2 S/F | 0946.8 | 0947.6 | 1.3 | | | | |
| | 536 | ONDR | 2 S/F | 0946.9 | 0947.8 | 1 | 20 | | | |
| | 1470 | BERL | 1 S | 0947.4 | 0947.5 | 0.6 | 1.2 | | | |
| | 9100 | ARCE | 1 S | 0953.1 | 0953.3 | 0.6 | | | | |
| | 1420 | ARCE | 41 F | 1004.7 | 1004.9 | 5.5 | | | | RECORD DISTURBE |
| | 1420 | ARCE | 8 S | 1004.7 | 1004.9 | 0.5 | | | | |
| | 1470 | BERL | 46 | 1006.5 | 1007.5 | 3.5 | 5.9 | | | |
| | 550 | KIEV | 40 F | 1006.5 | 1007.5 | 3.2 | 2.5 | | | |
| | 1420 | ARCE | 4 S/F | 1006.6 | 1007.5 | 1.8 | | | | |
| | 3000 | BERL | | 1006 | 1009.2 | | 2.5 | | | |
| | 3000 | BERL | 3 S | 1006 | 1007.1 | 4.5 | 2.5 | | | |
| | 1420 | ARCE | 4 S/F | 1008.8 | 1009.5 | 1.4 | | | | |
| | 930 | BORD | 41 F | 1105.1 | 1105.3 | 0.2 | 8 | 2 | | |
| | 536 | ONDR | 2 S/F | 1228.8 | 1228.8 | 0.8 | 21 | | | |
| | 1420 | ARCE | 1 S | 1229.3 | 1229.5 | 0.7 | | | | |
| | 1470 | BERL | 1 S | 1229 | 1229.3 | 3.5 | 2.5 | | | |
| | 1470 | BERL | 1 S | 1305.5 | 1305.9 | 1 | 1.6 | | | |
| | 2800 | OTTA | 21 GRF | 1445 | 1615 | 160 | 3 | 1.5 | | |
| | 4995 | BOUL | 23 GRF | 1527.5 | 1530 | 43.5 | 30 | 10 | | |
| | 4995 | SGMR | 4 S/F | 1528.8 | 1530.6 | 26.5 | 26 | 7.8 | | |
| | 2695 | SGMR | 4 S/F | 1529.3 | 1530.6 | 25.9 | 11 | 3.3 | | |
| | 9400 | HUAN | 3 S | 1529.6 | 1530.5 | 56.3 | 15.9 | 2.5 | | R |
| | 2800 | OTTA | 2 S/F | 1529.8 | 1530.5 | 3.2 | 9.6 | 3.2 | | |
| | 8800 | SGMR | 3 S | 1529.8 | 1530.5 | 25.1 | 14.9 | 4.5 | | |
| | 2800 | OTTA | 21 GRF | 1529 | 1534.5 | 25 | 6 | 2.8 | | |
| | 2695 | BOUL | 23 GRF | 1530 | 1531.5 | 24 | 9 | 3 | | |

# SOLAR RADIO EMISSION
# OUTSTANDING OCCURRENCES

**FEBRUARY 1977**

| FEB 1977 | FREQUENCY | STATION | TYPE | STARTING TIME UT | TIME OF MAXIMUM UT | DURATION MINUTES | FLUX DENSITY $10^{-22}$ Wm$^{-2}$ Hz$^{-1}$ PEAK | FLUX DENSITY $10^{-22}$ Wm$^{-2}$ Hz$^{-1}$ MEAN | INT | POLARIZATION OR REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2800 | OTTA | 1 S | 1557 | 1600 | 10 | 1.2 | 0.6 | | |
| | 2800 | OTTA | 22 GRF | 1740 | 1950 | 220 | 2.8 | 1.4 | | |
| | 9400 | HUAN | 3 S | 2215.6 | 2239.7 | 30.8 | 15.8 | 5 | | |
| 13 | 127 | TORN | 44 NS | 0700 E | 1427.3 | 460 D | 12 | | | |
| | 260 | ONDR | 44 NS | 0740 E | | 410 D | 29 | | | |
| | 221 | ABST | 44 NS | 0800 | 1006.2 | 120 | 31 | | | |
| | 3100 | CRIM | 21 GRF | 0753 | 0826 | 91 | 3 | 1 | | |
| | 1420 | ARCE | 21 GRF | 0814.7 | 0848.7 | 63 | | | | |
| | 1420 | ARCE | 8 S | 0823.5 | 0823.7 | 0.4 | | | | |
| | 9100 | ARCE | 20 GRF | 0824.7 | 0858.1 | 120 | | | | |
| | 1470 | BERL | 4 F | 0851 | 0853.5 | 5 | 6.8 | | | |
| | 1420 | ARCE | 45 C | 0851.1 | 0853.3 | 6.3 | | | | |
| | 930 | BORD | 46 C | 0852 | 0853.7 | 4 | 14 | 4 | | |
| | 3000 | BERL | 1 S | 0852 | 0853.7 | 3.5 | 3.9 | | | |
| | 3100 | CRIM | 1 S | 0852 | 0854 | 7 | 3 | 1 | | |
| | 221 | ABST | 45 C | 0930 | 0930.5 | 2 | 27 | 19 | | |
| | 221 | ABST | 45 C | 1005.8 | 1006.2 | 1.5 | 41 | 24 | | |
| | 3100 | CRIM | 24 R | 1124 | 1200 | 36 D | 6 | | | |
| | 2800 | OTTA | 20 GRF | 1320 | 1328 | 25 | 3 | 1.2 | | |
| | 2800 | OTTA | 20 GRF | 1348 | | 70 | 1.2 | 0.6 | | |
| | 1420 | BOUL | 40 F | 1658.5 | 1725.5 | 56 | 8 | 3 | | |
| | 2800 | OTTA | 21 GRF | 1700 | 1731 | 230 | 14 | 5.6 | | |
| | 2800 | OTTA | 40 F | 1705 | 1722.5 | 24 | 5.8 | | | |
| | 2695 | BOUL | 40 F | 1707 | 1723.5 | 33 | 11 | 4 | | |
| | 207 | VORO | 44 NS | 2300 | | 360 | | 10 | | |
| 14 | 200 | HIRA | 43 NS | 0000 | 0200 | 500 D | 15 | 5 | | SR |
| | 221 | ABST | 43 NS | 0700 | 0735 | 60 | 11 | | | |
| | 260 | ONDR | 44 NS | 0800 E | | 383 D | 17 | | | |
| | 221 | ABST | 6 S | 0734.8 | 0735 | 1.5 | 24 | 11 | | |
| | 550 | KIEV | 40 F | 0753.5 | 0756.5 | 5 | 1.7 | | | |
| | 550 | KIEV | 2 S/F | 0813 | | 6 | 2 | | | |
| | 1470 | BERL | 1 | 1405 | 1409 | 25 | 3.1 | | | |
| | 3000 | BERL | 4 F | 1406 | 1408.8 | 24 | 8.4 | | | |
| | 2800 | OTTA | | 1407 | | 78 D | 7.4 | | | |
| | 2800 | OTTA | 27A RF | 1700 | | 230 | 1.2 | 1.1 | | |
| | 2800 | OTTA | 24 R | 1700 | 1713 | 13 | 1.2 | 0.6 | | |
| | 2800 | OTTA | 24P R | 1713 | | 182 | 1.2 | | | |
| | 2800 | OTTA | 8 S | 1811.4 | 1811.5 | 0.3 | 1.2 | 0.6 | | |
| | 2800 | OTTA | 21 GRF | 1811 | 1825 | 20 | 0.8 | 0.4 | | |
| | 4995 | BOUL | 8 S | 1936.5 | 1937.5 | 2 | 22 | 7 | | |
| | 2800 | OTTA | 1 S | 1953 | 1956 | 8 | 1.8 | 0.9 | | |
| | 4995 | BOUL | 3 S | 2008.5 | 2009.5 | 2 | 10 | 3 | | |
| | 2800 | OTTA | 26 FAL | 2015 | 2050 | 35 | -1.2 | -0.6 | | |
| | 4995 | BOUL | 8 S | 2022 | 2022.5 | 1 | 17 | 6 | | |
| | 4995 | BOUL | 8 S | 2041 | 2041.5 | 1.5 | 15 | 5 | | |
| | 4995 | BOUL | 45 C | 2053 | 2055 | 2.5 | 10 | 3 | | |
| | 4995 | BOUL | 8 S | 2110.5 | 2111.5 | 2 | 41 | 14 | | |
| | 4995 | BOUL | 8 S | 2125 | 2125.5 | 1 | 16 | 5 | | |
| | 4995 | BOUL | 45 C | 2138 | 2140.5 | 3 | 11 | 4 | | |
| | 4995 | BOUL | 8 S | 2156 | 2156.5 | 1 | 20 | 7 | | |
| | 4995 | BOUL | 45 C | 2206.5 | 2209 | 3 | 16 | 5 | | |
| 15 | 200 | HIRA | 43 NS | 0230 | 0530 | 240 | 25 | 5 | | SL |
| | 207 | VORO | 43 NS | 0230 | | 150 | | 9 | | |
| | 700 | SYDN | 40 F | 0306.6 | 0306.9 | 2.3 | | | | |
| | 1400 | SYDN | 40 F | 0306.8 | 0307.4 | 0.7 | | | | |
| | 260 | ONDR | 44 NS | 0810 E | | 377 D | 12 | | | |
| 16 | 2930 | VORO | 28 PRF | 0232 | 0237 | 7 | 8 | | | |
| | 2930 | VORO | 42 SEP | 0239 | 0243 | 6 | 43 | | | |
| | 2930 | VORO | 47 GB | 0245 | 0246 | 3 | 134 | | | |
| | 1000 | TYKW | 5 S | 0422 | 0422.6 | 2 | 0.6 | 0.2 | | |
| | 2000 | TYKW | 5 S | 0422 | 0422.6 | 2 | 1.8 | 0.6 | | OR |
| | 169 | OWIN | 44 NS | 0946 E | | 290 D | | 1 | | |
| | 160 | OWIN | 44 NS | 0946 E | | 290 D | | 1 | | |
| | 260 | ONDR | 2 S/F | 1428 | 1428 | 0.4 | 6 | | | |
| | 2800 | OTTA | 20 GRF | 1525 | 1553 | 50 | 1 | 0.5 | | |
| | 4995 | BOUL | 8 S | 1816 | 1817 | 2 | 20 | 7 | | |
| | 4995 | BOUL | 3 S | 1851 | 1852.5 | 3 | 9 | 3 | | |
| | 4995 | BOUL | 45 C | 1914.5 | 1916.5 | 5.5 | 16 | 5 | | |
| | 1400 | SYDN | 8 S | 2232.4 | 2242.5 | 0.2 | | | | |
| | 700 | SYDN | 8 S | 2232.4 | 2232.5 | 0.2 | | | | |
| | 700 | SYDN | 8 S | 2242.3 | 2243.4 | 0.2 | | | | |
| 17 | 3100 | CRIM | 3 S | 0603 | 0607 | 12 | 18 | 6 | | |
| | 3750 | TYKW | 45 C | 0603 | 0606.5 | 12 | 18 | 7 | | 10R |
| | 3750 | TYKW | 29 PBI | 0615 | | 85 D | 5 | 4 D | | |
| | 2695 | MANI | 4 S/F | 0604 | 0607.2 | 12.3 | 13.8 | 6.9 | | |
| | 4995 | MANI | 4 S/F | 0604.2 | 0607 | 12.1 | 26.9 | 9.5 | | 2-SPA |
| | 1415 | MANI | 2 S/F | 0604.5 | 0607.2 | 8.5 | 9.6 | 4.8 | | |
| | 9400 | TYKW | 45 C | 0604 | 0606.3 | 25 | 12 | 4 | | 25L |
| | 1000 | TYKW | 45 C | 0605 | 0606.3 | 5 | 17 | 6 | | |
| | 1000 | TYKW | 29 PBI | 0610 | | 100 D | 1.6 | 1 D | | |

# SOLAR RADIO EMISSION
# OUTSTANDING OCCURRENCES

**FEBRUARY 1977**

| FEB 1977 | FREQUENCY | STATION | TYPE | STARTING TIME UT | TIME OF MAXIMUM UT | DURATION MINUTES | FLUX DENSITY $10^{-22}$ Wm$^{-2}$ Hz$^{-1}$ PEAK | FLUX DENSITY MEAN | INT | POLARIZATION OR REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2000 | TYKW | 45 C | 0605 E | 0606.6 | 10 D | 19 | 5 D | | OR |
| | 2000 | TYKW | 29 PBI | 0615 | | 95 D | 3 | 2.5D | | |
| | 930 | BORD | 8 S | 0831.9 | 0831.9 | 0.1 | 15 | 1 | | |
| | 3100 | CRIM | 1 S | 0944 | 0944.5 | 1 | 2 | 1 | | |
| | 1420 | ARCE | 4 S/F | 1047.9 | 1048 | 0.7 | | | | |
| | 930 | BORD | 41 F | 1104.8 | 1104.9 | 0.1 | 15 | 2 | | |
| | 2800 | OTTA | 24 R | 1345 | 1350 | 5 | 0.6 | 0.3 | | |
| | 2800 | OTTA | 27 RF | 1345 | | 47 | 0.6 | 0.5 | | |
| | 2800 | OTTA | 24P R | 1350 | | 37 | 0.6 | | | |
| | 2800 | OTTA | 26 FAL | 1427 | 1432 | 5 | -0.6 | -0.3 | | |
| | 2800 | OTTA | 20 GRF | 1520 | 1531 | 20 | 1.4 | 0.7 | | |
| | 2800 | OTTA | 21 GRF | 1520 | 1640 | 120 | 2.2 | 1.1 | | |
| | 2695 | SGMR | 20 GRF | 1525 | 1546.8 | 3166 | 6.2 | 3.7 | | SWF |
| | 4995 | SGMR | 20 GRF | 1526.3 | 1546.7 | 27.9 | 4.8 | 2.9 | | SWF |
| | 2800 | OTTA | 1 S | 1546.5 | 1547 | 2 | 1.4 | 0.8 | | |
| | 2800 | OTTA | 1A S | 1546 | 1551 | 10 | 1.8 | 0.9 | | |
| | 4995 | BOUL | 45 C | 2143.5 | 2151.5 | 10 | 29 | 10 | | |
| | 2695 | BOUL | 8 S | 2148 | 2149 | 3 | 14 | 4 | | |
| | 2695 | BOUL | 3 S | 2152.5 | 2153.5 | 1.5 | 4 | 1 | | |
| | 4995 | BOUL | 45 C | 2213 | 2220.5 | 8.5 | 49 | 16 | | |
| | 2695 | BOUL | 45 C | 2217.5 | 2222 | 7.5 | 180 | 60 | | |
| | 700 | SYDN | 4 S | 2241.2 | 2241.3 | 0.8 | | | | |
| | 700 | SYDN | 40 F | 2256.7 | 2256.8 | 1.5 | | | | |
| | 700 | SYDN | 40 F | 2313.2 | 2313.4 | 1.1 | | | | |
| | 700 | SYDN | 40 F | 2329.2 | 2330 | 1 | | | | |
| | 700 | SYDN | 40 F | 2356.6 | 2356.8 | 0.4 | | | | |
| 18 | 700 | SYDN | 40 F | 0000.3 | 0000.8 | 0.9 | | | | |
| | 700 | SYDN | 40 F | 0009.1 | 0009.3 | 0.7 | | | | |
| | 700 | SYDN | 40 F | 0011.8 | 0012.4 | 0.7 | | | | |
| | 700 | SYDN | 40 F | 0038.8 | 0039.3 | 0.7 | | | | |
| | 1480 | SYDN | 4 S | 0041.7 | 0042.4 | 1 | | | | |
| | 700 | SYDN | 40 F | 0041.7 | 0042.6 | 1.1 | | | | |
| | 700 | SYDN | 40 F | 0222.3 | 0222.5 | 0.3 | | | | |
| | 3100 | CRIM | 26 FAL | 0716 | 0832 | | 6 | | | |
| | 550 | KIEV | 20 GRF | 0727.2 | 0730 | 19 | 2.6 | | | |
| | 550 | KIEV | | 0727.2 | 0747.5 | | | | | |
| | 3100 | CRIM | 24 R | 0855 | 0948 | | 4 | | | |
| | 260 | ONDR | 42 SER | 1131.8 | 1132.3 | 8 | 6 | | | |
| | 2800 | OTTA | 20 GRF | 1700 | 1725 | 50 | 1.2 | 0.6 | | |
| 20 | 2000 | TYKW | 45 C | 0149.5 | 0151 | 2.5 | 6 | 2 | | 65L |
| | 260 | ONDR | 8 S | 1316.2 | 1316.2 | 0.3 | 20 | | | |
| 21 | 207 | VORO | 48 C | 0248 | 0249 | 2 | 26 | | | |
| | 260 | ONDR | 42 SER | 0859 | 0859 | 10 | 21 | | | |
| | 260 | ONDR | 8 S | 0926.3 | 0926.3 | 0.3 | 20 | | | |
| | 260 | ONDR | 42 SER | 0951.5 | 0955 | 7.5 | 35 | | | |
| | 3100 | CRIM | 1 S | 1210.5 | 1211 | 1 | 2 | 1 | | |
| | 3100 | CRIM | 41 F | 1216 | 1217 | 3 | 2 | 1 | | |
| | 3100 | CRIM | 42 GER | 1226 | 1226 | 7 | 2.5 | 1 | | |
| 23 | 550 | KIEV | 40 F | 0800 E | | 360 D | 3 | | | |
| | 4995 | BOUL | 8 S | 1952.5 | 1953.5 | 1.5 | 19 | 6 | | |
| | 207 | VORO | 48 C | 2357 | 2358 | 2 | 48 | | | |
| 24 | 127 | TORN | 43 NS | 0842 U | 1223 | 386 D | 35 | | | |
| | 260 | ONDR | 4 S/F | 1404.2 | 1405 | 0.8 | 10 | | | |
| | 536 | ONDR | 4 S/F | 1404.5 | 1404.5 | 0.8 | 34 | | | |
| 25 | 1420 | ARCE | 21 GRF | 0952.4 | 0957.3 | 23 | | | | |
| | 1420 | ARCE | 1 S | 0954.9 | 0955 | 0.5 | | | | |
| | 550 | KIEV | 46 C | 1335 | 1359.2 | 60 U | 7.6 | | | |
| 26 | 3100 | CRIM | 26 FAL | 0912 | 0947 | | 4 | | | |
| 28 | 207 | VORO | 6 S | 0141 | 0141.5 | 2 | 85 | | | |
| | 207 | VORO | 40 F | 0225 | 0225 | 15 | 53 | | | |
| | 207 | VORO | | 0225 | 0235 | | 43 | | | |
| | 207 | VORO | | 0225 | 0228 | | 36 | | | |
| | 207 | VORO | 6 S | 0253 | 0254 | 2 | 54 | | | |
| | 3100 | CRIM | 20 GRF | 0811 | 0841 | 126 | 2 | 1 | | |
| | 550 | KIEV | 32 ABS | 0919 | | 8 | 1.7 | | | |
| | 2800 | OTTA | 21 GRF | 2039 | 2210 | 220 D | 5 | | | |
| | 2800 | OTTA | 20 GRF | 2040 | 2044 | 20 | 4 | 2 | | |

Reports received from the following observatories:

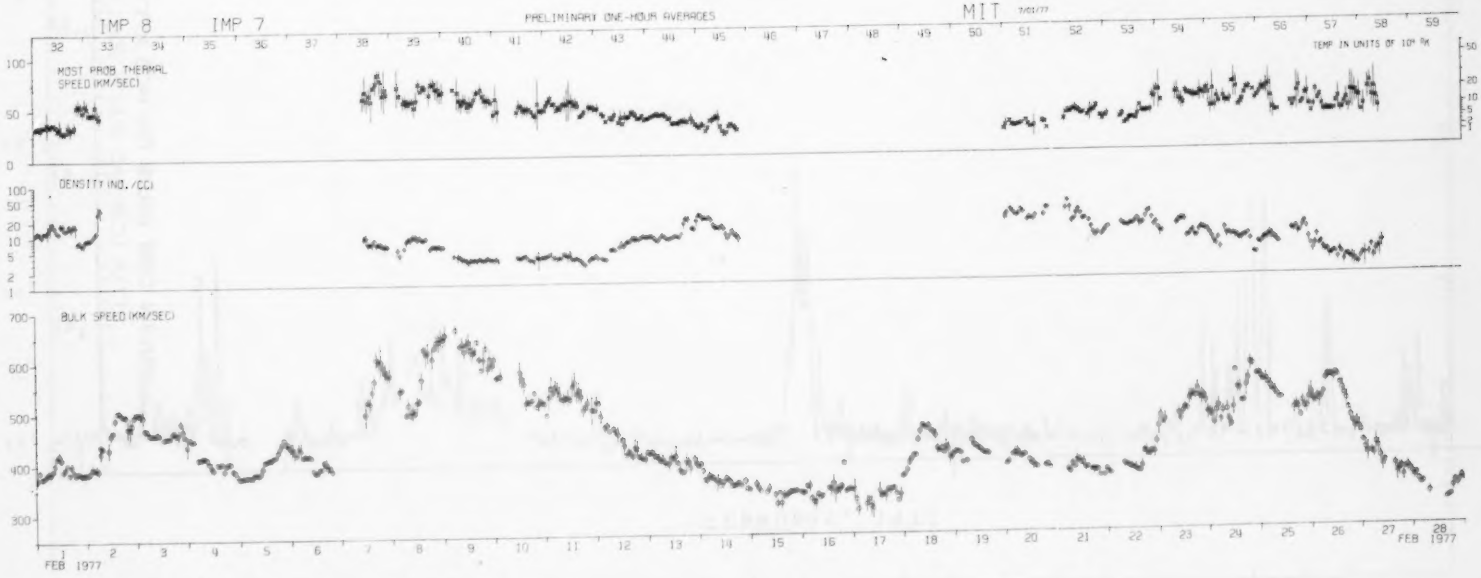
ARCE = Arcetri
BERL = Berlin-Adlershof
BORD = Bordeaux
BOUL = Boulder
CRIM = Simferopol
DWIN = Dwingeloo
GORK = Gorky
HARS = Harestua
HIRA = Hiraiso
HUAN = Huancayo
IRKU = Irkutsk
KIEV = Kiev
MANI = Manila
MCMA = McMath-Hulbert
ONDR = Ondrejov
OTTA = Ottawa
PENT = Penticton
POTS = Potsdam
SAOP = Sao Paulo
SGMR = Sagamore Hill
SYDN = Sydney
TORN = Torun
TYKW = Toyokawa
TRST = Trieste
VORO = Voroshilov (Ussurisk)

Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

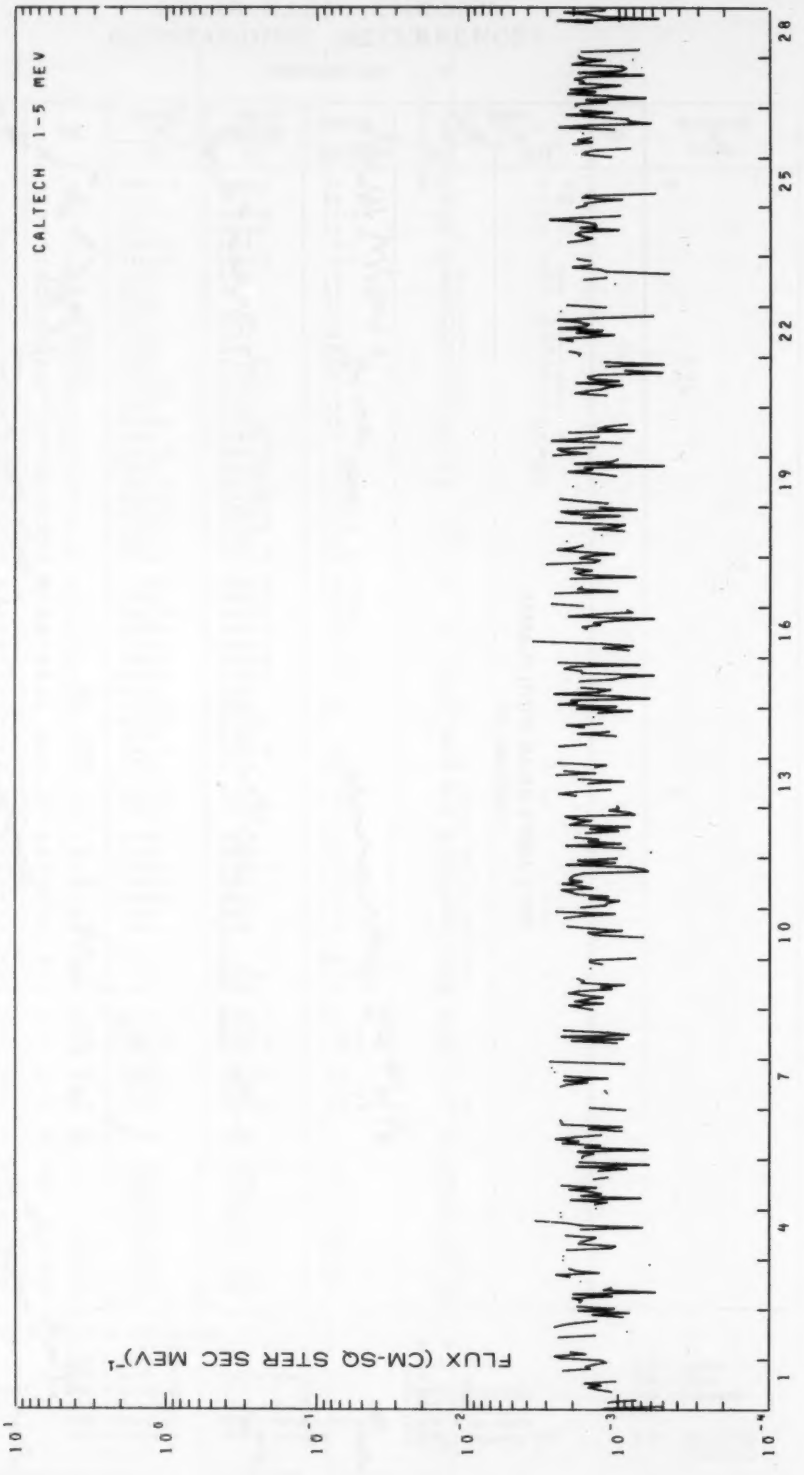
## IMP 7 AND 8 SOLAR WIND PLASMA

**FEBRUARY 1977**



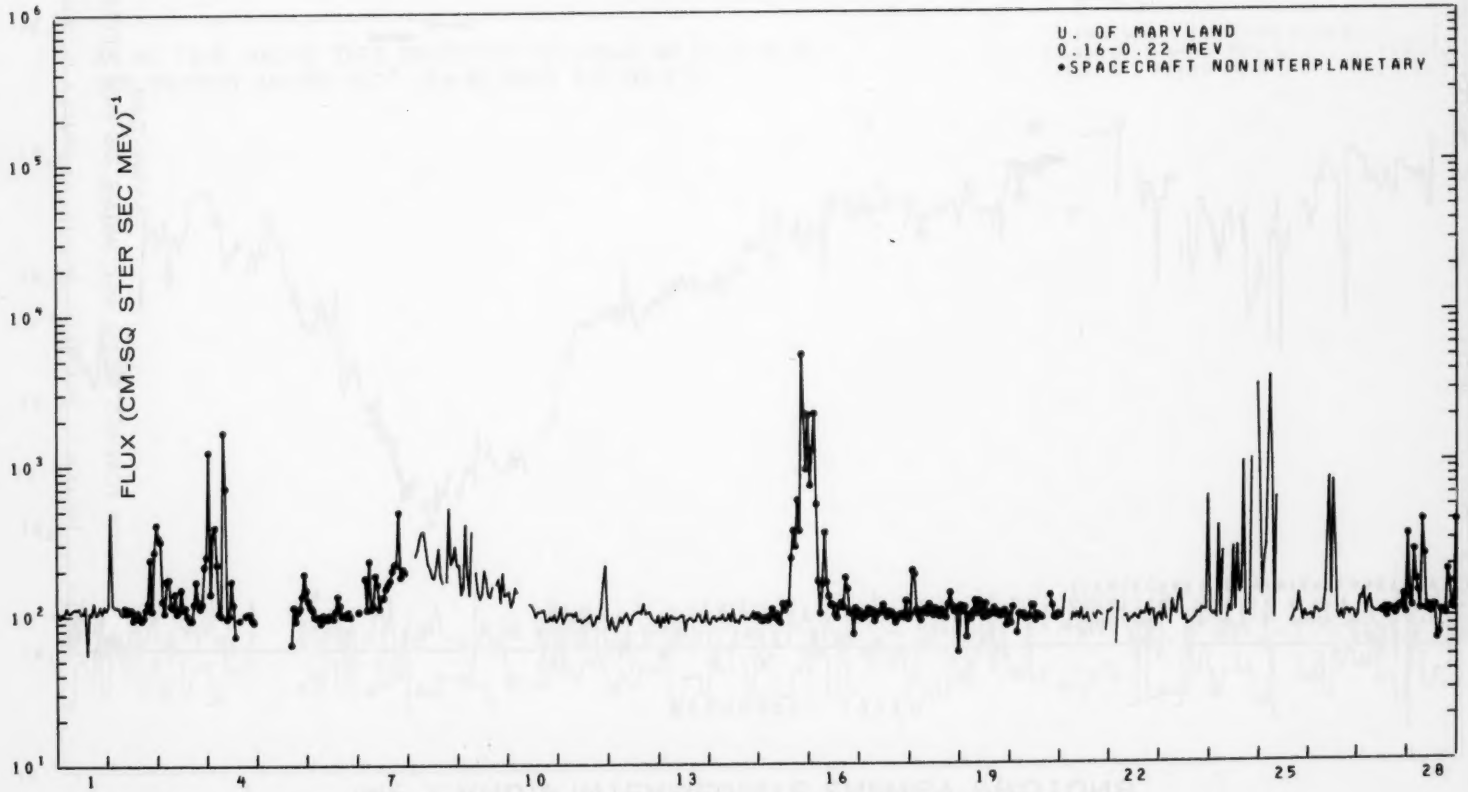
# IMP 7 AND 8 ELECTRONS

FEBRUARY, 1977



# IMP 7 AND 8 LOW ENERGY PROTONS

FEBRUARY, 1977

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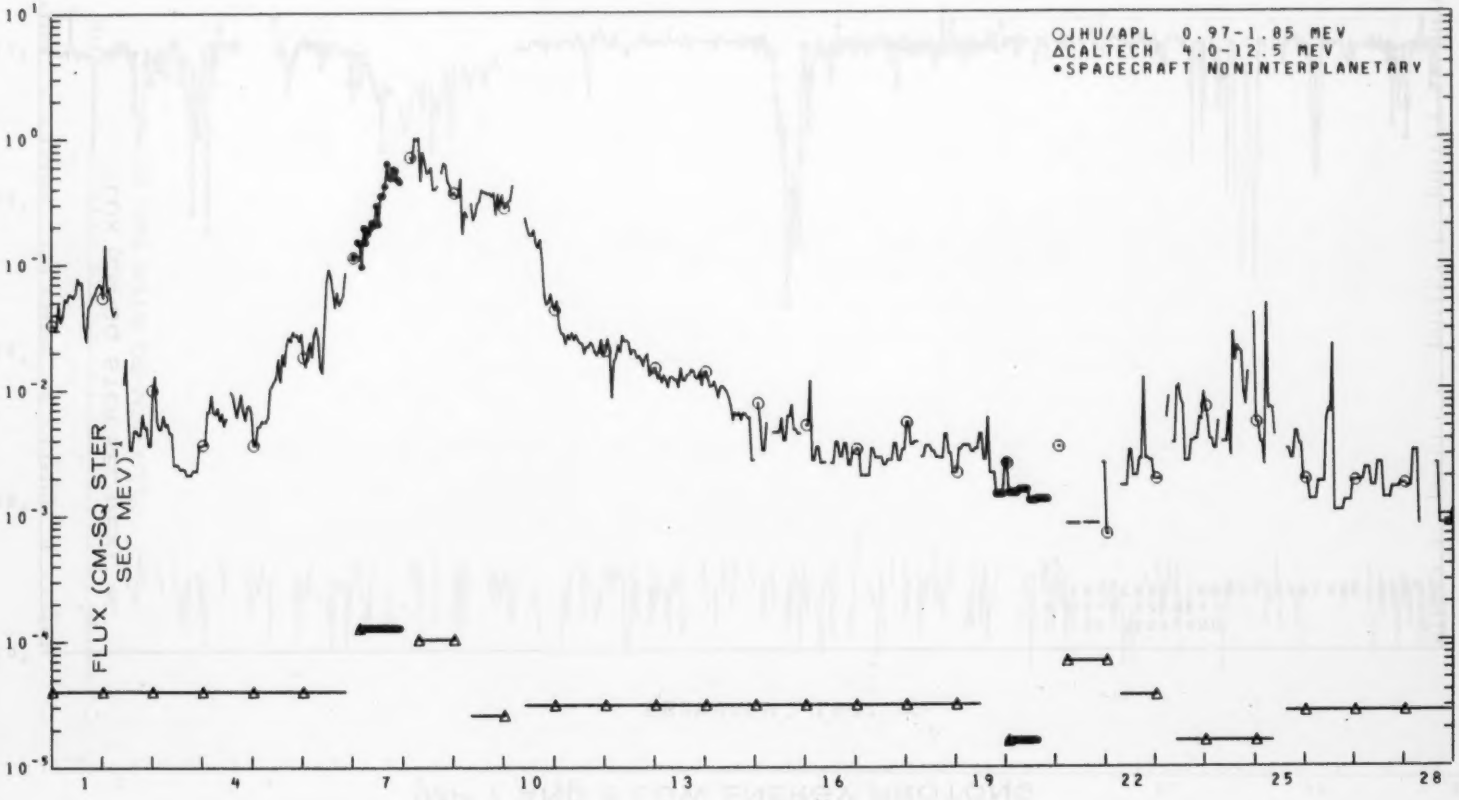
Feb 77

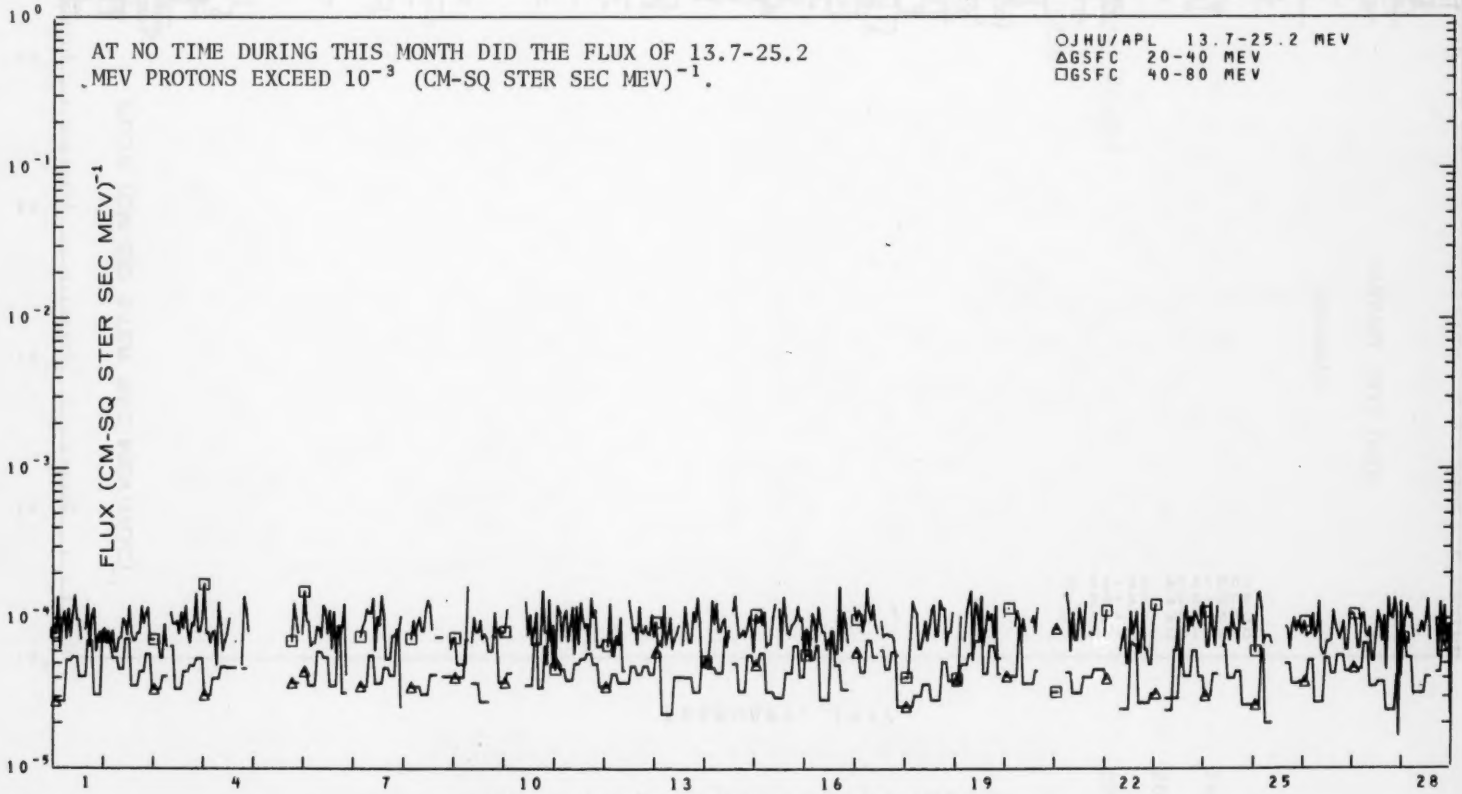
# IMP 7 AND 8 INTERMEDIATE ENERGY PROTONS

FEBRUARY, 1977



# IMP 7 AND 8 HIGH ENERGY PROTONS

FEBRUARY, 1977

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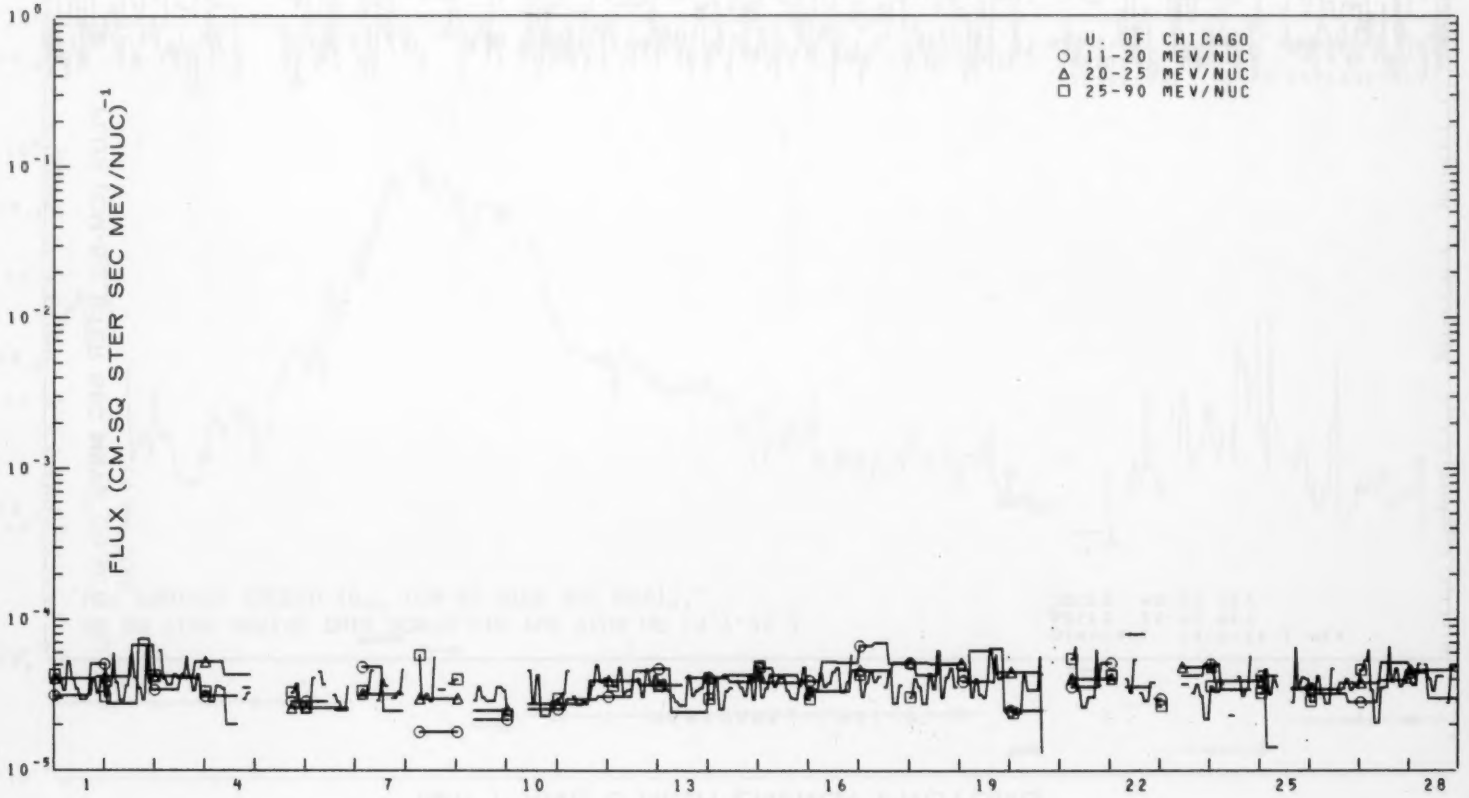
Feb 77

# IMP 7 AND 8 ALPHA PARTICLES

FEBRUARY, 1977



# JANUARY 1977 DATA

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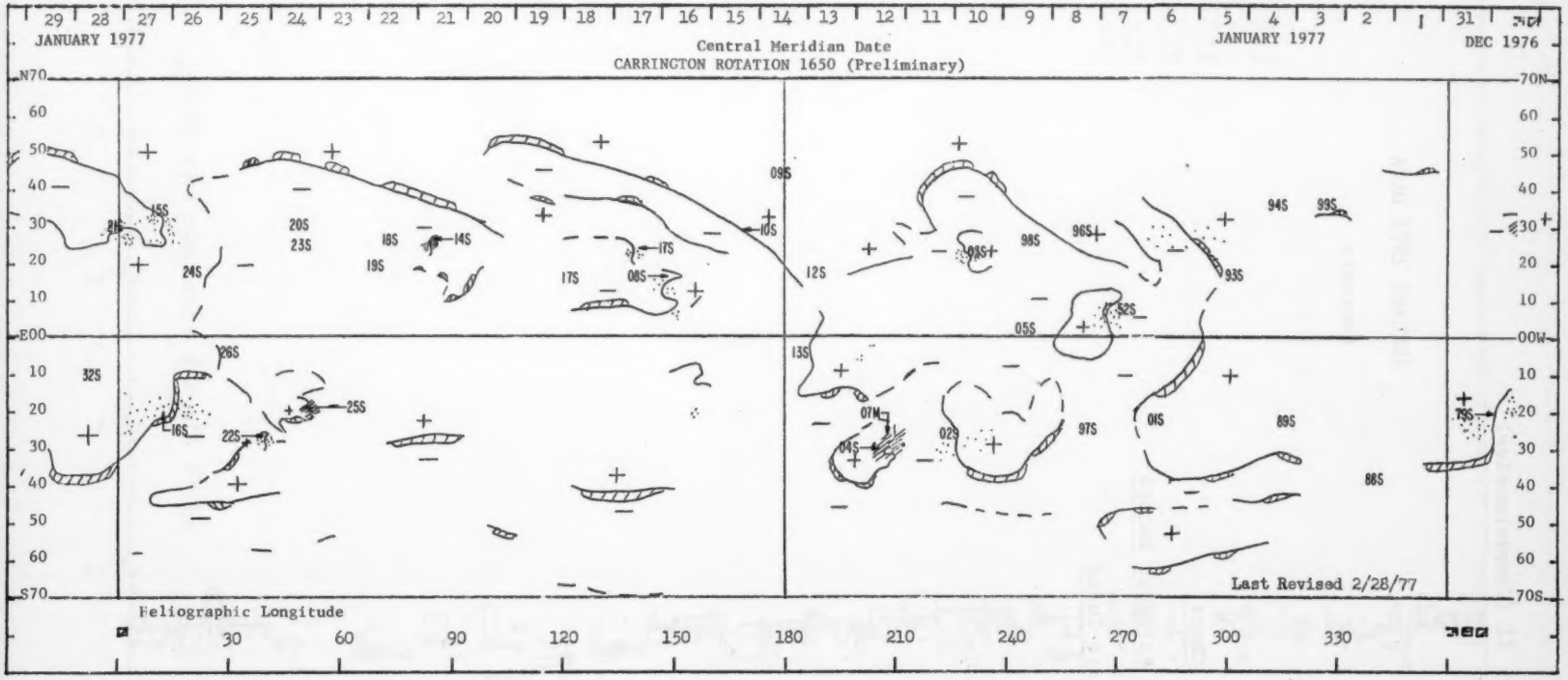
| Abbreviated Calendar Record | 28-35 |
| Regional Flare Index | 35 |

# ABBREVIATED CALENDAR RECORD

## Hα SYNOPTIC CHART

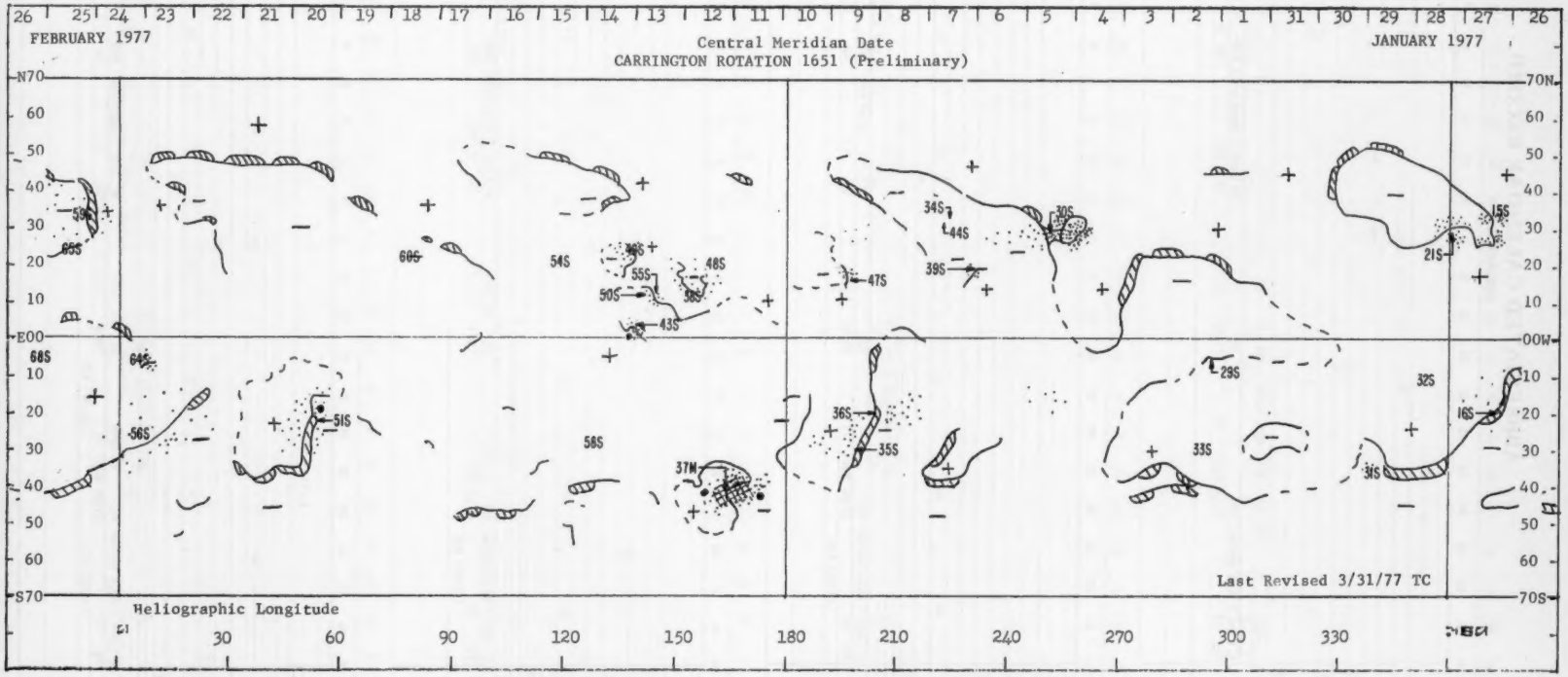
### DECEMBER 1976 - JANUARY 1977



# ABBREVIATED CALENDAR RECORD

## Hα SYNOPTIC CHART

### JANUARY 1977 - FEBRUARY 1977




27 Jan 77

# ABBREVIATED CALENDAR RECORD

JANUARY 1977

Jan. 1, 1977

| | | 00–24 |
|---|---|---|
| FLARES | | — 1f/79 |
| Bursts | cm | |
| | dm | |
| | m | ← ns → |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap17 D4* | Kp | 3- 3o 4- 4- 3+ 2o 3- 4o |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- no data SW- no data |
| Indices | | Rz: 20 10cm flux: 76 Flare: 37/20.2 Ca: 11.1 Ip: 0 Ia: 4 |
| Solar Regions | | |
| Sunspots | | |

Jan. 2, 1977

| | | 00–24 |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | ← ns - |
| SID | | |
| X-Rays | | |
| Ap 5 Q4K | Kp | 3o 1o 1o 0+ 0+ 1- 1o 1- |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- SW- |
| Indices | | Rz: 32 10cm flux: 79 Flare: 7/22.8 Ca: 8.6 Ip: 1 Ia: 3 |
| Solar Regions | | (14588) S39 |
| Sunspots | | |

Jan. 3, 1977

| | | 00–24 |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | → ← ns - |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 6 | Kp | 2o 2o 1+ 1o 0+ 2+ 2+ 2+ |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW- |
| Indices | | Rz: 25 10cm flux: 79 Flare: 4/15.8 Ca: no data Ip: 1 Ia: 3 |
| Solar Regions | | (14599) N36 |
| Sunspots | | |

Jan. 4, 1977

| | | 00–24 |
|---|---|---|
| FLARES | | — 1n/91 |
| Bursts | cm | |
| | dm | |
| | m | → ← ns → |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 10 | Kp | 1+ 1+ 2o 3- 3- 3o 3- 3- |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | | E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- SW- |
| Indices | | Rz: 22 10cm flux: 78 Flare: 11/22.0 Ca: 5.3 Ip: 0 Ia: 3 |
| Solar Regions | | (14589) S23 (14594) N37 |
| Sunspots | | |

Jan. 5, 1977 — 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm; dm; m — noise storm; Dkm

SID

X-Rays

Ap 15 — Kp: 4- | 4o | 2o | 1+ | 1+ | 3o | 3- | 4o

sc

Aurora: USSR; W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- no data; SE- no data; W. Limb 7 days later: NW- no data; SW- no data

Indices — Rz: 21; 10cm flux: 76; Flare: 1/20.3; Ca: 4.0; Ip: 0; Ia: 5

Solar Regions: (14593) N17

Sunspots

---

Jan. 6, 1977 — 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm; dm; m; Dkm

SID

X-Rays

Ap 10 — Kp: 4o | 3- | 2- | 1+ | 2o | 2+ | 2+ | 2o

sc

Aurora: USSR; W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE-; SE; W. Limb 7 days later: NW-; SW-

Indices — Rz: 13; 10cm flux: 75; Flare: 0/20.5; Ca: no data; Ip: 0; Ia: 1

Solar Regions: (14601) S22

Sunspots

---

Jan. 7, 1977 — 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm; dm; m; Dkm

SID

X-Rays

Ap 7 — Kp: 3o | 2o | 3- | 1o | 1+ | 1o | 2- | 1-

sc

Aurora: USSR; W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE-; SE-; W. Limb 7 days later: NW-; SW-

Indices — Rz: 0; 10cm flux: 74; Flare: 0/22.3; Ca: 2.1; Ip: 0; Ia: 4

Solar Regions: 14592 N06(2)

Sunspots: 19741 N05 (ap) 3 CMP Jan. 6

---

Jan. 8, 1977 — 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm; dm; m; Dkm

SID

X-Rays

Ap6 09 — Kp: 1+ | 2- | 1+ | 2o | 2o | 3- | 1+ | 1-

sc

Aurora: USSR; W.E.

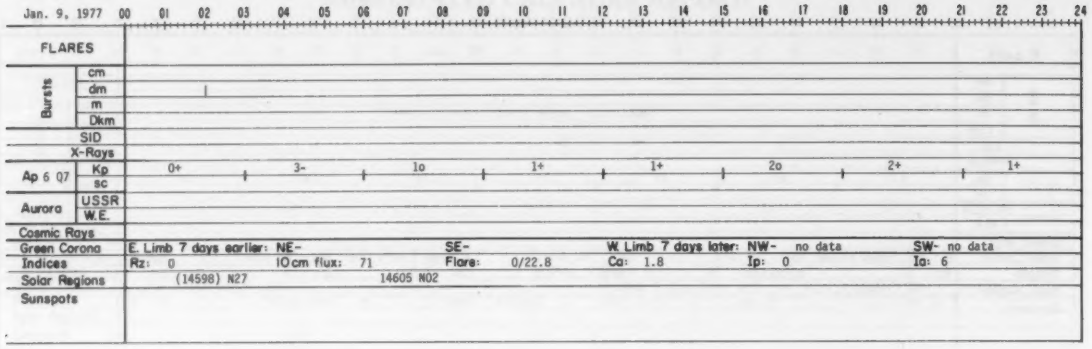
Cosmic Rays

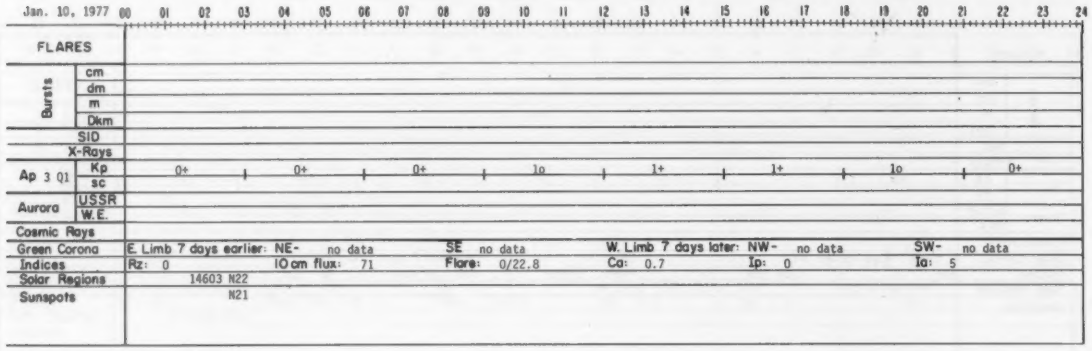
Green Corona — E. Limb 7 days earlier: NE- no data; SE no data; W. Limb 7 days later: NW-; SW-

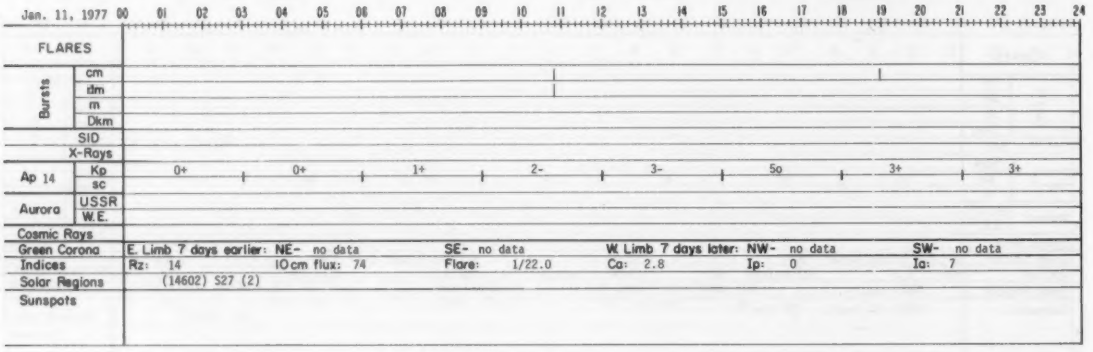
Indices — Rz: 0; 10cm flux: 72; Flare: 0/24.0; Ca: no data; Ip: 0; Ia: 6

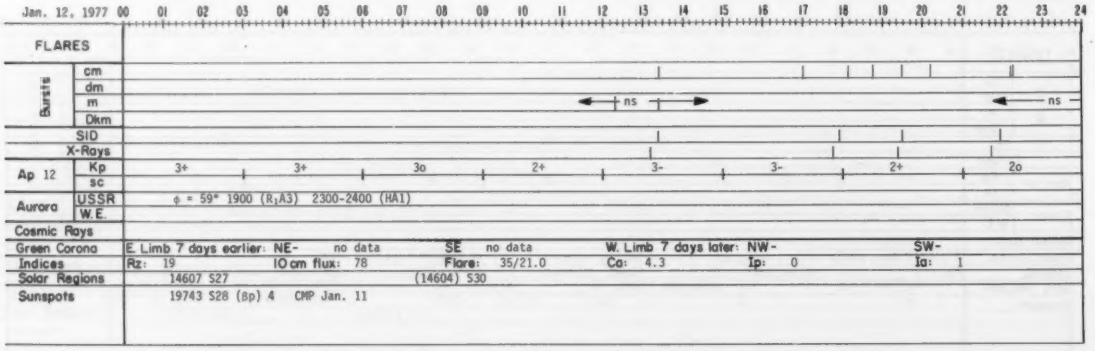
Solar Regions: (14597) S25; 14596 N29 (3)

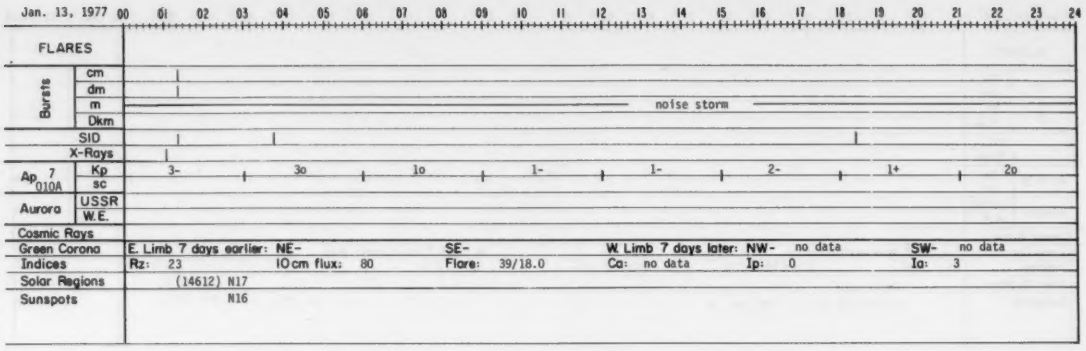
Sunspots

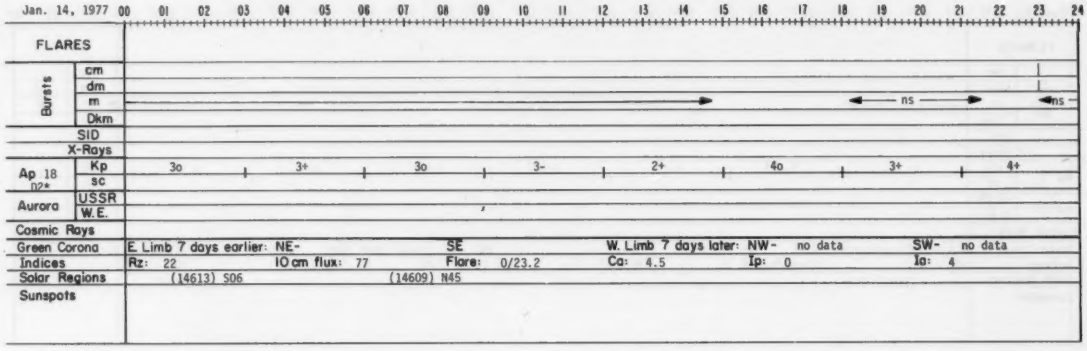

Jan. 9, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 6 Q7
Kp
sc
0+ 3- 1o 1+ 1+ 2o 2+ 1+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 0 10 cm flux: 71 Flare: 0/22.8 Ca: 1.8 Ip: 0 Ia: 6
Solar Regions
(14598) N27 14605 N02
Sunspots

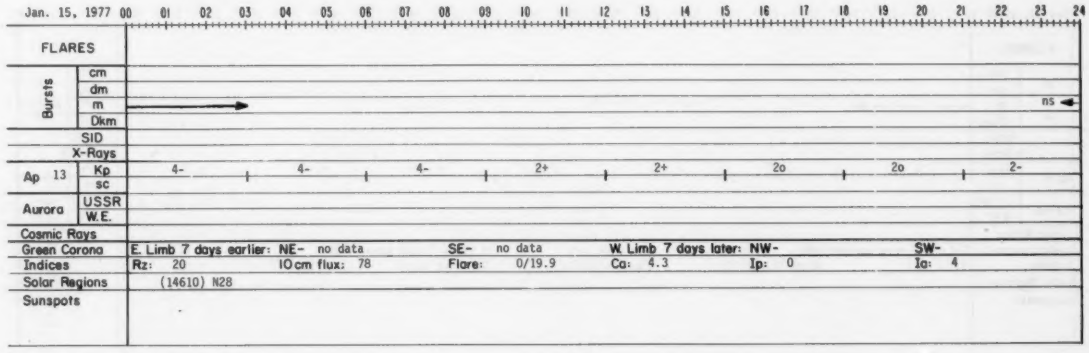

Jan. 10, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 3 Q1
Kp
sc
0+ 0+ 0+ 1o 1+ 1+ 1o 0+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 0 10 cm flux: 71 Flare: 0/22.8 Ca: 0.7 Ip: 0 Ia: 5
Solar Regions
14603 N22
Sunspots
N21

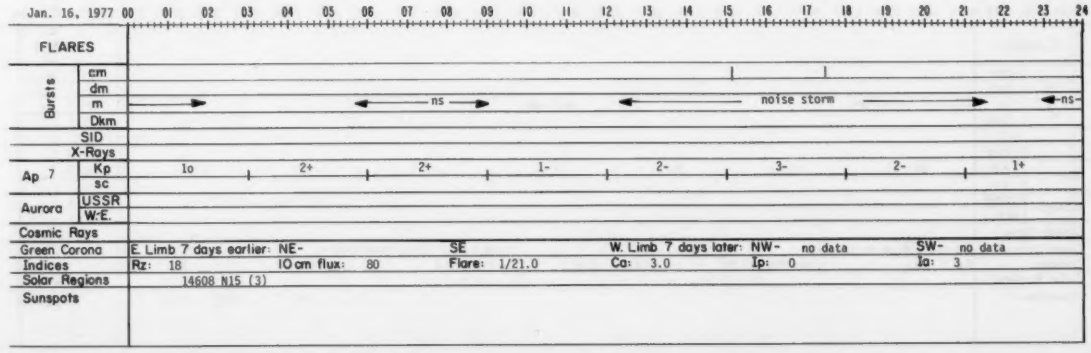

Jan. 11, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 14
Kp
sc
0+ 0+ 1+ 2- 3- 5o 3+ 3+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 14 10 cm flux: 74 Flare: 1/22.0 Ca: 2.8 Ip: 0 Ia: 7
Solar Regions
(14602) S27 (2)
Sunspots


Jan. 12, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
ns
ns
Dkm
SID
X-Rays
Ap 12
Kp
sc
3+ 3+ 3o 2+ 3- 3- 2+ 2o
Aurora
USSR
ϕ = 59° 1900 (R1A3) 2300-2400 (HA1)
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- SW-
Indices
Rz: 19 10 cm flux: 78 Flare: 35/21.0 Ca: 4.3 Ip: 0 Ia: 1
Solar Regions
14607 S27 (14604) S30
Sunspots
19743 S28 (βp) 4 CMP Jan. 11


Jan. 13, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
noise storm
Dkm
SID
X-Rays
Ap 7 010A
Kp 3- 3o 1o 1- 1- 2- 1+ 2o
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 23 10cm flux: 80 Flare: 39/18.0 Ca: no data Ip: 0 Ia: 3
Solar Regions
(14612) N17
Sunspots
N16


Jan. 14, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
ns
ns
Dkm
SID
X-Rays
Ap 18 n2*
Kp 3o 3+ 3o 3- 2+ 4o 3+ 4+
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 22 10cm flux: 77 Flare: 0/23.2 Ca: 4.5 Ip: 0 Ia: 4
Solar Regions
(14613) S06 (14609) N45
Sunspots


Jan. 15, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
ns
Dkm
SID
X-Rays
Ap 13
Kp 4- 4- 4- 2+ 2+ 2o 2o 2-
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW-
Indices
Rz: 20 10cm flux: 78 Flare: 0/19.9 Ca: 4.3 Ip: 0 Ia: 4
Solar Regions
(14610) N28
Sunspots


Jan. 16, 1977
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
ns
noise storm
ns
Dkm
SID
X-Rays
Ap 7
Kp 1o 2+ 2+ 1- 2- 3- 2- 1+
sc
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- SE W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 18 10cm flux: 80 Flare: 1/21.0 Ca: 3.0 Ip: 0 Ia: 3
Solar Regions
14608 N15 (3)
Sunspots

Jan. 17, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm, dm, m, Dkm — ns

SID

X-Rays

Ap 6 Q8 — Kp: 2o | 2- | 2- | 1+ | 2o | 3- | 1- | 1o — sc

Aurora — USSR, W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE-; SE-; W. Limb 7 days later: NW-; SW-

Indices — Rz: 30; 10cm flux: 79; Flare: 5/21.2; Ca: 2.0; Ip: 0; Ia: 3

Solar Regions — 14611 N23

Sunspots — (19744) N22 (8) 3 CMP Jan. 16

Jan. 18, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm, dm, m — noise storm, Dkm

SID

X-Rays

Ap 10 — Kp: 3o | 3+ | 4- | 3- | 2o | 1o | 1- | 1- — sc

Aurora — USSR, W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE-; SE; W. Limb 7 days later: NW- no data; SW- no data

Indices — Rz: 26; 10cm flux: 78; Flare: 0/23.1; Ca: 1.9; Ip: 0; Ia: 4

Solar Regions — (14617) N16

Sunspots

Jan 19, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm, dm, m — ns, Dkm

SID

X-Rays

Ap 8 — Kp: 3o | 2- | 1o | 1+ | 0+ | 2- | 3- | 3+ — sc

Aurora — USSR, W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE- no data; SE- no data; W. Limb 7 days later: NW-; SW-

Indices — Rz: 7; 10cm flux: 79; Flare: 1/22.1; Ca: no data; Ip: 2; Ia: 3

Solar Regions

Sunspots

Jan. 20, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

FLARES

Bursts: cm, dm, m — ns, Dkm

SID

X-Rays

Ap 12 — Kp: 3+ | 4o | 2+ | 2+ | 2- | 1+ | 2+ | 3o — sc

Aurora — USSR, W.E.

Cosmic Rays

Green Corona — E. Limb 7 days earlier: NE-; SE; W. Limb 7 days later: NW-; SW-

Indices — Rz: 0; 10cm flux: 78; Flare: 0/16.0; Ca: 0.9; Ip: 0; Ia: 2

Solar Regions

Sunspots

Jan. 21, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 5 Q5 | Kp | 3- 1- 2- 2+ 0+ 2- 0+ 0+ |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | E. Limb 7 days earlier: NE- | SE- W. Limb 7 days later: NW- no data SW- no data |
| Indices | Rz: 15 10cm flux: 76 | Flare: 0/21.4 Ca: 2.6 Ip: 1 Ia: 5 |
| Solar Regions | 14614 N26 | |
| Sunspots | 19745 N26 (δ) 4 CMP Jan. 20 | |

Jan. 22, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

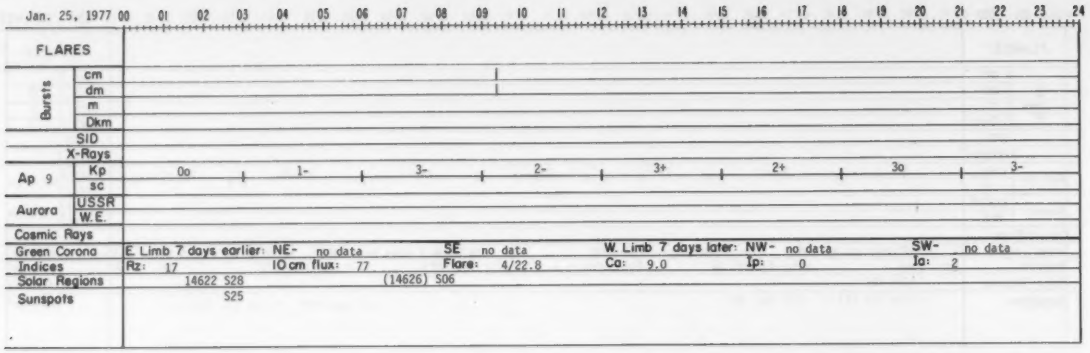
| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | ns |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 7 | Kp | 0+ 2- 1o 1+ 3o 1+ 2o 3- |
| | sc | |
| Aurora | USSR | |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | E. Limb 7 days earlier: NE- | SE- W. Limb 7 days later: NW- no data SW- no data |
| Indices | Rz: 24 10cm flux: 79 | Flare: 8/19.3 Ca: 6.2 Ip: 0 Ia: 5 |
| Solar Regions | (14618) N28 | (14519) N20 |
| Sunspots | | |

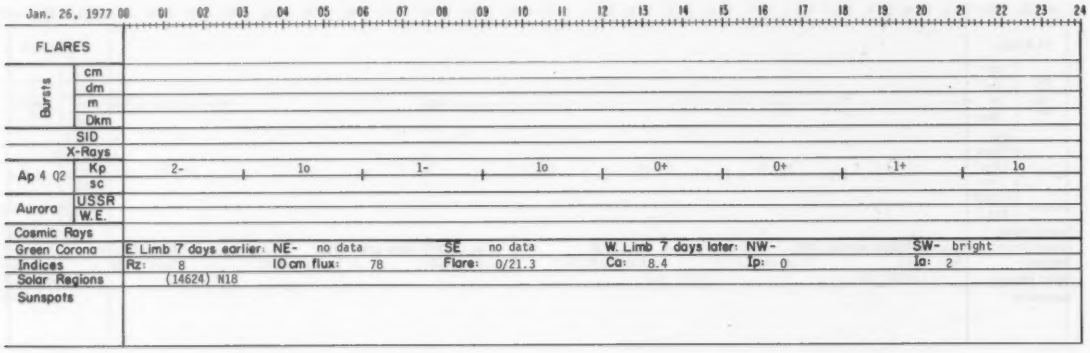
Jan. 23, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

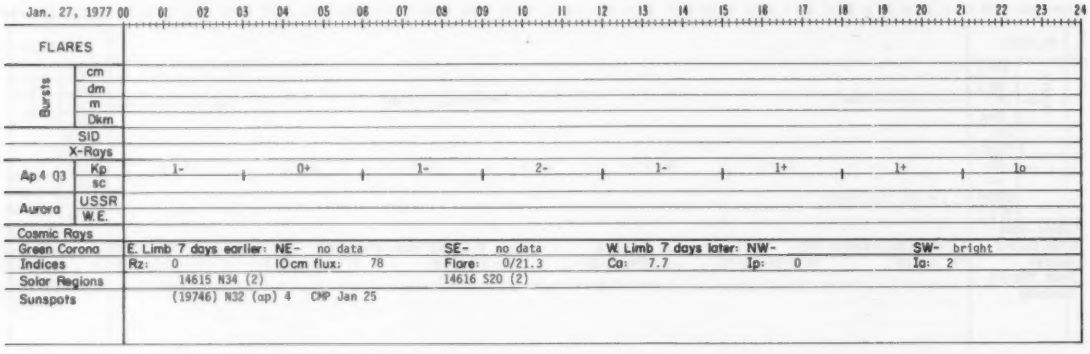
| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | ns |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 6 Q6 | Kp | 2- 1- 0+ 1o 1o 2- 2+ 3- |
| | sc | |
| Aurora | USSR | ϕ = 59° 2100 ($R_1A1$) |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | E. Limb 7 days earlier: NE- | SE W. Limb 7 days later: NW- no data SW- no data |
| Indices | Rz: 34 10cm flux: 81 | Flare: 2/6.3 Ca: 7.6 Ip: 0 Ia: 2 |
| Solar Regions | | |
| Sunspots | | |

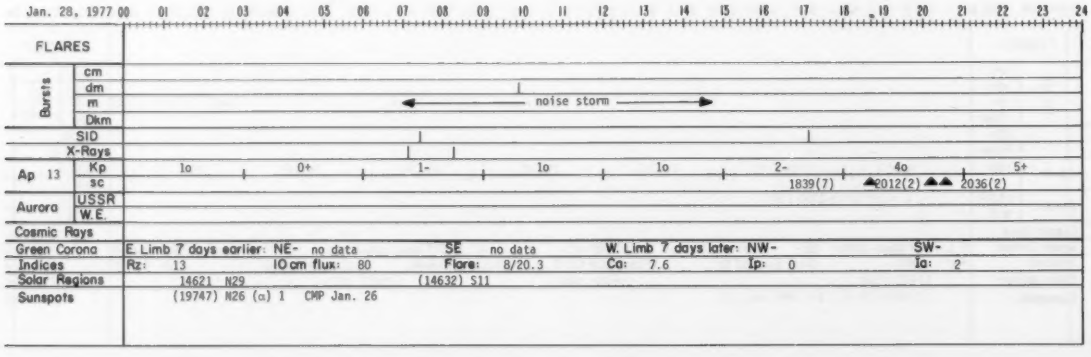
Jan. 24, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

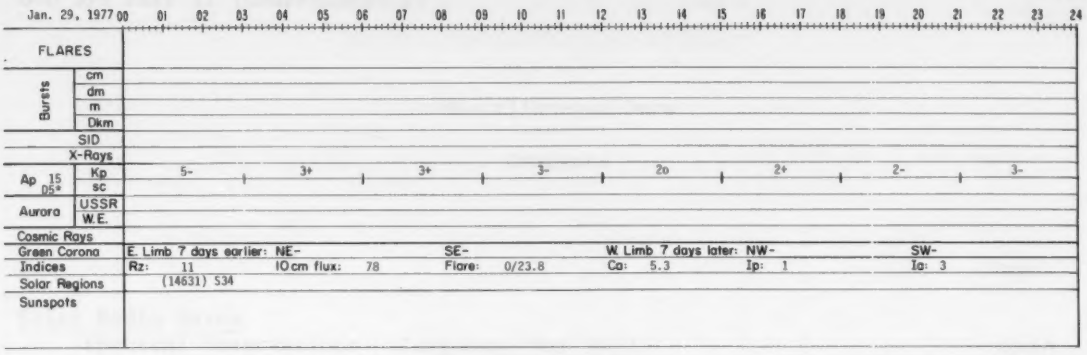
| | | |
|---|---|---|
| FLARES | | |
| Bursts | cm | |
| | dm | |
| | m | |
| | Dkm | |
| SID | | |
| X-Rays | | |
| Ap 8 | Kp | 3o 2+ 2+ 1+ 2o 2o 2o 1+ |
| | sc | |
| Aurora | USSR | ϕ = 59° 2200-2300 (SB1) |
| | W.E. | |
| Cosmic Rays | | |
| Green Corona | E. Limb 7 days earlier: NE- no data | SE- no data W. Limb 7 days later: NW- SW- bright |
| Indices | Rz: 35 10cm flux: 80 | Flare: 4/22.6 Ca: no data Ip: 0 Ia: 2 |
| Solar Regions | (14625) S20 | (14620) N30 (14623) N23 |
| Sunspots | (19748) S18 (β) 3 CMP Jan. 23 | |

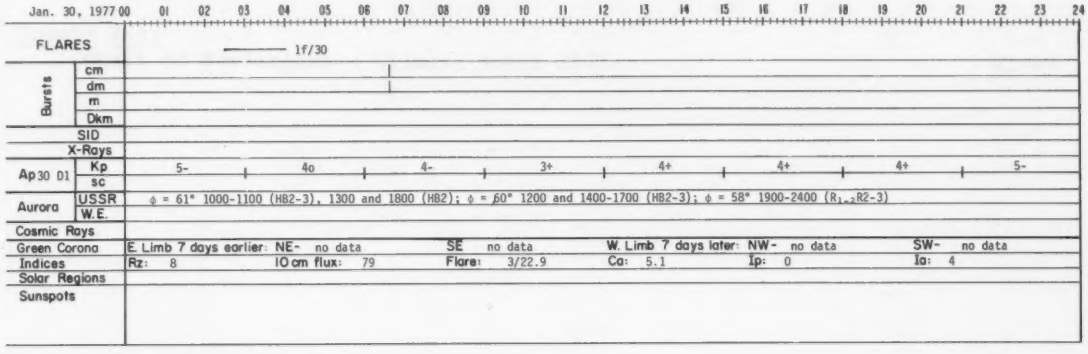

Jan. 25, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts cm dm m Dkm
SID
X-Rays
Ap 9 Kp 0o 1- 3- 2- 3+ 2+ 3o 3-
sc
Aurora USSR W.E.
Cosmic Rays
Green Corona E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data SW- no data
Indices Rz: 17 10cm flux: 77 Flare: 4/22.8 Ca: 9.0 Ip: 0 Ia: 2
Solar Regions 14622 S28 (14626) S06
Sunspots S25

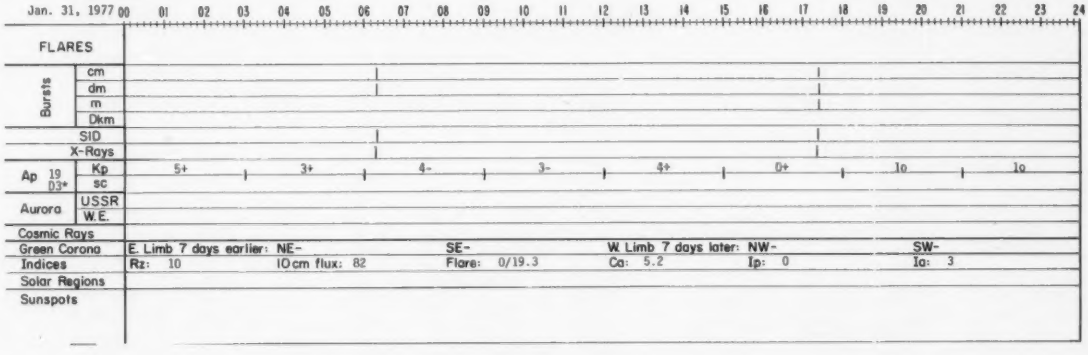

Jan. 26, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts cm dm m Dkm
SID
X-Rays
Ap 4 Q2 Kp 2- 1o 1- 1o 0+ 0+ 1+ 1o
sc
Aurora USSR W.E.
Cosmic Rays
Green Corona E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- SW- bright
Indices Rz: 8 10cm flux: 78 Flare: 0/21.3 Ca: 8.4 Ip: 0 Ia: 2
Solar Regions (14624) N18
Sunspots


Jan. 27, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts cm dm m Dkm
SID
X-Rays
Ap 4 Q3 Kp 1- 0+ 1- 2- 1- 1+ 1+ 1o
sc
Aurora USSR W.E.
Cosmic Rays
Green Corona E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW- bright
Indices Rz: 0 10cm flux: 78 Flare: 0/21.3 Ca: 7.7 Ip: 0 Ia: 2
Solar Regions 14615 N34 (2) 14616 S20 (2)
Sunspots (19746) N32 (ap) 4 CMP Jan 25


Jan. 28, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts cm dm m Dkm
noise storm
SID
X-Rays
Ap 13 Kp 1o 0+ 1- 1o 1o 2- 4o 5+
sc 1839(7) 2012(2) 2036(2)
Aurora USSR W.E.
Cosmic Rays
Green Corona E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- SW-
Indices Rz: 13 10cm flux: 80 Flare: 8/20.3 Ca: 7.6 Ip: 0 Ia: 2
Solar Regions 14621 N29 (14632) S11
Sunspots (19747) N26 (α) 1 CMP Jan. 26


Jan. 29, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts cm dm m Dkm
SID
X-Rays
Ap 15 D5* Kp 5- 3+ 3+ 3- 2o 2+ 2- 3-
sc
Aurora USSR W.E.
Cosmic Rays
Green Corona E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- SW-
Indices Rz: 11 10cm flux: 78 Flare: 0/23.8 Ca: 5.3 Ip: 1 Ia: 3
Solar Regions (14631) S34
Sunspots


Jan. 30, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES 1f/30
Bursts cm dm m Dkm
SID
X-Rays
Ap 30 D1 Kp 5- 4o 4- 3+ 4+ 4+ 4+ 5-
sc
Aurora USSR φ = 61° 1000-1100 (HB2-3), 1300 and 1800 (HB2); φ = 60° 1200 and 1400-1700 (HB2-3); φ = 58° 1900-2400 (R1,2R2-3)
W.E.
Cosmic Rays
Green Corona E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data SW- no data
Indices Rz: 8 10cm flux: 79 Flare: 3/22.9 Ca: 5.1 Ip: 0 Ia: 4
Solar Regions
Sunspots


Jan. 31, 1977 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts cm dm m Dkm
SID
X-Rays
Ap 19 D3* Kp 5+ 3+ 4- 3- 4+ 0+ 1o 1o
sc
Aurora USSR W.E.
Cosmic Rays
Green Corona E. Limb 7 days earlier: NE- SE- W. Limb 7 days later: NW- SW-
Indices Rz: 10 10cm flux: 82 Flare: 0/19.3 Ca: 5.2 Ip: 0 Ia: 3
Solar Regions
Sunspots

## REGIONAL FLARE INDEX
### INCLUDES ALL FLARES

| HC MATH PLAGE NO. | LAT | CMP DATE | DATE FIRST FLARE | DATE LAST FLARE | FLARE-INDEX SUM | FLARE-INDEX MEAN | TOTAL NO. OF FLARES |
|---|---|---|---|---|---|---|---|
| 14607 | S28 | 77/01/12.4 | 77/01/11 | 77/01/19 | 72.59 | 8.17 | 25 |
| 10607 | S28 | 77/01/12.4 | 77/01/12 | 77/01/12 | 5.66 | 5.66 | 1 |
| 14614 | N26 | 77/01/21.6 | 77/01/22 | 77/01/25 | 15.64 | 3.91 | 6 |
| 14625 | S19 | 77/01/24.4 | 77/01/28 | 77/01/28 | 4.36 | 4.36 | 2 |
| 14615 | N34 | 77/01/27.1 | 77/01/23 | 77/01/23 | 2.47 | 2.47 | 1 |
| 14621 | N29 | 77/01/28.1 | 77/01/26 | 77/01/28 | 3.76 | 3.76 | 1 |

Note:
Because of differences in method of calculation, the dates of Central Meridian Passage for the McMath Plage Regions vary somewhat from those given elsewhere. Any region not listed here produced no flares during its disk passage.

# Miscellaneous Data

## Contents

| | Page |
|---|---|
| Solar Radio Waves | |
| Spectral Observations - Culgoora, May 1977 | 38-40 |
| Selected Events by Radioheliograph, May 1977 | 41 |
| Cosmic Rays | |
| Chart of Variations - Climax, April 1977 | 42-43 |

# SOLAR RADIO EMISSION
# SPECTRAL OBSERVATIONS

MAY 1977

| | TIMES OF OBSERVATION | | STATION | EVENTS | | | | | | | | | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DECIMETRIC BAND | | | METRIC BAND | | | DEKAMETRIC BAND | | | |
| | START UT | END UT | | START UT | END UT | INT | START UT | END UT | INT | START UT | END UT | INT | |
| 01 | 0000 | 0730 | CULG | | | | 0000 | 0120 | | | | | IS,W |
| | | | CULG | | | | 0015.5 | | | | | | IIIB,W |
| | | | CULG | | | | 0019.5 | | | | | | IIIB,W |
| | | | CULG | | | | 0046 | 0047 | | | | | IIIG,W |
| | | | CULG | 0220 | 0220.5 | | | | | | | | IIIG,W |
| | 2029 | 2400 | CULG | | | | | | | | | | |
| 02 | 0000 | 0729 | CULG | | | | | | | | | | |
| | 2029 | 2400 | CULG | | | | | | | | | | |
| 03 | 0000 | 0729 | CULG | 0004 | 0004.5 | 1 | 0004 | 0006.5 | 1 | | | | IIIG |
| | | | CULG | | | | 0246.5 | | | | | | IIIB,W |
| | | | CULG | | | | 0256 | 0257.5 | 1 | | | | IIIG |
| | | | CULG | | | | 0525 | | | | | | IIIB,W |
| | 2029 | 2400 | CULG | | | | | | | | | | |
| 04 | 0000 | 0715 | CULG | | | | | | | | | | |
| | 2029 | 2400 | CULG | | | | | | | | | | |
| 05 | 0000 | 0728 | CULG | | | | | | | | | | |
| | 2029 | 2400 | CULG | | | | | | | | | | |
| 06 | 0000 | 0728 | CULG | 0240 | | 1 | 0240 | | 2 | | | | IIIB |
| | | | CULG | | | | 0242 | 0243 | 1 | | | | IIIG |
| | | | CULG | | | | 0245.5 | | 1 | | | | IIIB |
| | | | CULG | | | | 0331 | 0335.5 | 1 | | | | IIIGG |
| | | | CULG | | | | 0422 | 0423 | | | | | IIIG,W |
| | | | CULG | | | | 0447 | | 1 | | | | IIIB |
| | | | CULG | | | | 0450 | 0521 | | | | | IIIN,W |
| | | | CULG | | | | 0521 | 0556 | 1 | | | | IIIN |
| | | | CULG | 0640 | 0640.5 | 1 | 0636.5 | 0641 | 2 | 0639 | 0641 | 1 | IIIGG |
| | 2029 | 2400 | CULG | | | | 2029 | 2400 | | | | | IIIN,W |
| | | | CULG | | | | 2116 | | 1 | | | | IIIB |
| | | | CULG | | | | 2140.5 | 2149 | 1 | 2142.5 | 2143.5 | 1 | IIIGG |
| 07 | 0000 | 0728 | CULG | | | | 0000 | 0728 | 1 | | | | IIIGN |
| | | | CULG | 0014 | 0014.5 | 1 | 0013 | 0016 | 2 | 0014 | 0015 | 1 | IIIGG,V |
| | | | CULG | 0054.5 | 0055.5 | 1 | 0054 | 0057 | 2 | 0054 | 0057 | 1 | IIIGG,V |
| | | | CULG | | | | 0133.5 | 0134.5 | 2 | 0134 | 0134.5 | 1 | IIIG |
| | | | CULG | | | | 0219 | 0221 | 2 | 0219 | 0221 | 1 | IIIGG,V |
| | | | CULG | | | | 0243 | 0245 | 2 | 0243 | 0244.5 | 1 | IIIG,V |
| | | | CULG | | | | 0247.5 | 0249.5 | 2 | 0247.5 | 0249.5 | 2 | IIIGG,V |
| | | | CULG | | | | 0305.5 | 0309 | 2 | 0305.5 | 0309 | 1 | IIIGG,V |
| | | | CULG | 0310 | | 1 | 0310 | | 2 | | | | IIIB |
| | | | CULG | 0313.5 | 0314.5 | 1 | 0312.5 | 0315 | 2 | 0312.5 | 0314 | 2 | IIIGG,V |
| | | | CULG | | | | 0322.5 | 0323.5 | 1 | 0322.5 | 0323.5 | 1 | IIIG |
| | | | CULG | | | | 0324 | 0325 | 2 | 0324 | 0325 | 1 | IIIG,V |
| | | | CULG | | | | 0407 | 0408.5 | 2 | | | | IIIG,V |
| | | | CULG | 0452 | 0458 | 1 | 0447 | 0507 | 1 | 0451 | 0457 | 1 | IIIGG,V |
| | | | CULG | 0550 | 0551 | 1 | 0550 | 0551 | 2 | 0550 | 0551 | 1 | IIIG,V |
| | | | CULG | 2131 | 2132 | | 2131 | 2132 | | | | | IIIG,W |
| | 2029 | 2400 | CULG | | | | 2131 | 2400 | 1 | | | | IIIN |
| | | | CULG | | | | 2339 | 2339.5 | 1 | | | | IIIB,V |
| 08 | 0000 | 0728 | CULG | | | | 0049 | 0728 | 1 | | | | IIIN |
| | | | CULG | | | | 0112 | 0112.5 | 1 | | | | IIIB,V |
| | | | CULG | 0124 | 0124.5 | 1 | 0124 | 0124.5 | 1 | | | | IIIG |
| | | | CULG | | | | 0137 | 0138 | 1 | | | | IIIB,V |
| | | | CULG | 0142.5 | 0143 | 1 | 0142.5 | 0145 | 2 | 0142.5 | 0144 | 1 | IIIG,V |
| | | | CULG | | | | 0308 | 0309 | 1 | | | | IIIG,V |
| | | | CULG | | | | 0326 | 0328 | 1 | | | | IIIG,V |
| | | | CULG | 0332 | 0332.5 | | 0332 | 0333 | 2 | | | | IIIG,V |
| | | | CULG | 0339 | 0339.5 | | 0339 | 0340 | 1 | | | | IIIG,V |
| | | | CULG | | | | 0514 | 0515.5 | 1 | | | | IIIG |
| | | | CULG | | | | 0533.5 | 0535 | 1 | | | | IIIG,V |
| | | | CULG | | | | 0542.5 | 0543 | 1 | | | | IIIG |
| | 2028 | 2400 | CULG | 2314 | 2314.5 | | 2314 | 2314.5 | | | | | IIIG,W |
| | | | CULG | | | | 2321.5 | 2322 | 1 | | | | IIIG |
| | | | CULG | | | | 2328 | 2328.5 | 1 | | | | IIIG |
| 09 | 0000 | 0716 | CULG | | | | 0135.5 | | | | | | IIIB,W |

# SOLAR RADIO EMISSION
# SPECTRAL OBSERVATIONS

**MAY 1977**

| | TIMES OF OBSERVATION | | STATION | EVENTS | | | | | | | | | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DECIMETRIC BAND | | | METRIC BAND | | | DEKAMETRIC BAND | | | |
| | START UT | END UT | | START UT | END UT | INT | START UT | END UT | INT | START UT | END UT | INT | |
| 09 | | | CULG | 0201 | 0202 | | 0201 | 0202.5 | | | | | IIIG,W |
| | | | CULG | | | | 0210 | 0211 | | | | | IIIG,W |
| | | | CULG | | | | 0255.5 | | | | | | IIIB,W |
| | | | CULG | | | | 0538.5 | | | | | | IIIB,W |
| | | | CULG | | | | 0558 | | | | | | IIIB,W |
| | 2029 | 2400 | CULG | | | | | | | | | | |
| 10 | 0000 | 0628 | CULG | | | | 0402 | | | | | | IIIB,W |
| | | | CULG | | | | 0529 | 0610 | | | | | IIIN,W |
| | 2028 | 2400 | CULG | | | | 2028 | 2400 | 1 | | | | IIIN |
| | | | CULG | 2053 | 2053.5 | 1 | 2053 | 2054 | 1 | 2053 | 2053.5 | 1 | IIIG |
| | | | CULG | 2055.5 | 2056.5 | 1 | 2055.5 | 2056.5 | 1 | | | | IIIG |
| | | | CULG | | | | 2123.5 | 2124.5 | 2 | | | | IIIG |
| | | | CULG | 2224 | 2225 | 1 | 2224 | 2225 | 1 | | | | IIIG |
| | | | CULG | 2326 | 2327 | 1 | 2326 | 2327 | 2 | | | | IIIG,U |
| | | | CULG | 2335.5 | 2336 | 1 | 2335.5 | 2336 | 2 | 2335.5 | 2336 | 1 | IIIG |
| 11 | 0000 | 0728 | CULG | | | | 0000 | 0355 | 1 | | | | IIIN,W |
| | | | CULG | 0116 | 0117.5 | 1 | 0116 | 0117.5 | 1 | | | | IIIG |
| | | | CULG | 0206 | 0207 | 1 | 0206 | 0207 | 1 | | | | IIIG |
| | | | CULG | | | | 0325 | 0327 | 1 | | | | IIIG |
| | | | CULG | | | | 0355 | 0728 | 1 | | | | IIIS |
| | | | CULG | 0503 | 0504 | 1 | 0503 | 0504.5 | 2 | | | | IIIG,V |
| | | | CULG | | | | 0614 | 0617.5 | | | | | IS,W |
| | 2028 | 2400 | CULG | | | | | | | | | | |
| 12 | 0000 | 0728 | CULG | | | | | | | | | | |
| | 2028 | 2400 | CULG | | | | | | | | | | |
| 13 | 0000 | 0728 | CULG | | | | | | | | | | |
| | 2028 | 2400 | CULG | | | | 2355 | | | | | | IIIB,W |
| 14 | 0000 | 0728 | CULG | | | | 0124 | 0124.5 | | | | | IIIG,W |
| | | | CULG | | | | 0238 | 0238.5 | | | | | IIIG,W |
| | 2028 | 2115 | CULG | | | | | | | | | | |
| | 2308 | 2400 | CULG | | | | | | | | | | |
| 17 | 0000 | 0728 | CULG | | | | | | | | | | |
| | 2028 | 2400 | CULG | 2115 | 2116 | 1 | | | | | | | FAST DRIFT |
| 18 | 0000 | 0728 | CULG | | | | | | | | | | |
| | 2028 | 2400 | CULG | | | | 2122 | | 1 | | | | IIIB |
| 19 | 0000 | 0728 | CULG | | | | 0028 | 0043 | | | | | II, W |
| | | | CULG | | | | 0104.5 | | | | | | IIIB,W |
| | 2028 | 2400 | CULG | | | | 2320.5 | | | | | | IIIB,W |
| 20 | 0000 | 0728 | CULG | | | | | | | | | | |
| | 2028 | 2120 | CULG | | | | | | | | | | |
| | 2240 | 2400 | CULG | | | | | | | | | | |
| 21 | 0000 | 0728 | CULG | 0503.5 | 0504 | 1 | 0502.5 | 0504 | 2 | 0503 | 0504 | 1 | IIIG |
| | | | CULG | | | | 0505.5 | 0506 | | | | | IIIG,W |
| | 2029 | 2400 | CULG | | | | | | | | | | |
| 22 | 0000 | 0729 | CULG | | | | 0000 | 0002 | 1 | | | | IIIG |
| | | | CULG | | | | 0515 | 0520.5 | | | | | IIIGG,W |
| | | | CULG | | | | 0623.5 | 0625 | | | | | IIIG,W |
| | | | CULG | | | | 0638.5 | 0640 | 2 | 0638 | 0640.5 | 1 | IIIG,V |
| | | | CULG | | | | 0640.5 | 0641.5 | | | | | IIIG,W |
| | | | CULG | 0647 | 0647.5 | 1 | 0643.5 | 0652 | 2 | | | | IIIGG |
| | 2029 | 2400 | CULG | | | | | | | | | | |
| 23 | 0000 | 0728 | CULG | | | | 0410.5 | | | | | | IIIB,W |
| | | | CULG | | | | 0414 | 0415 | | | | | IIIG,W |
| | | | CULG | | | | 0420.5 | | | | | | IIIB,W |
| | 2029 | 2400 | CULG | | | | 2239.5 | 2240.5 | 1 | | | | IIIG |
| | | | CULG | | | | 2352 | 2353.5 | 1 | | | | IIIG,U |
| 24 | 0000 | 0729 | CULG | | | | | | | | | | |

# SOLAR RADIO EMISSION
# SPECTRAL OBSERVATIONS
## MAY 1977

| | TIMES OF OBSERVATION | | STATION | EVENTS | | | | | | | | | SPECTRAL TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DECIMETRIC BAND | | | METRIC BAND | | | DEKAMETRIC BAND | | | |
| | START UT | END UT | | START UT | END UT | INT | START UT | END UT | INT | START UT | END UT | INT | |
| 24 | 2029 | 2400 | CULG | | | | | | | | | | |
| 25 | 0000 | 0715 | CULG | | | | | | | | | | |
| | 2029 | 2400 | CULG | | | | | | | | | | |
| 26 | 0000 | 0729 | CULG | | | | 0549 | | | | | | IIIB,W |
| | 2029 | 2400 | CULG | | | | | | | | | | |
| 27 | 0000 | 0729 | CULG | | | | | | | | | | |
| | 2029 | 2400 | CULG | | | | | | | | | | |
| 28 | 0000 | 0729 | CULG | | | | | | | | | | |
| | 2029 | 2400 | CULG | | | | | | | | | | |
| 29 | 0000 | 0729 | CULG | | | | | | | | | | |
| | 2029 | 2400 | CULG | | | | | | | | | | |
| 30 | 0000 | 0716 | CULG | | | | 0050.5 | 0051 | 1 | | | | IIIG |
| | | | CULG | 0350 | 0351 | 1 | 0350 | 0351 | 1 | | | | IIIG |
| | | | CULG | 0412 | 0412.5 | 1 | 0412 | 0412.5 | 1 | | | | IIIG |
| | 2030 | 2400 | CULG | 2030 | 2400 | 1 | 2105 | 2400 | 1 | | | | IS |

The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of bursts
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III
RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity

# SELECTED SOLAR EVENTS

## MAY 1977

**Culgoora**

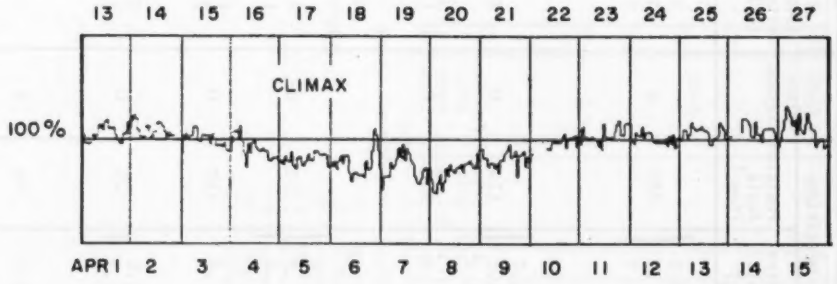
| UT Date 1977. MAY | HELIOGRAPH EVENT | | | | | | | Spectral Type | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | Start (UT) | End (UT) | Freq. (MHz) | Positions: Central Dist. ($R_\odot$) | Positions: Position Angle (Deg.) | Polarization | Intensity (1-3) | | |
| 7 | 0454 | 0458 | 43.25<br>80<br>160 | 1.2<br>.9<br>.7 | 330 | 0 | 3<br>3<br>2 | IIIGG,V | * Other type III activity from this region on 9th and 11th. |
| 8 | 0142 | 0144 | 43.25<br>80<br>160 | 1.7<br>1.5<br>1.3 | 110 | 0 | 3 | IIIG,V | * |
| 11 | 0300 | 0500 | 80<br>160 | .9 | 120 | ℓ | 1<br>not recorded | I | |
| 21 | 0503 | 0504 | 43.25<br>80<br>160 | .6<br>.5<br>.4 | 350 | 0 | 2<br>1 | IIIG | |
| 23 | 2352 | 2354 | 80<br>160 | .7 | 310 | 0 | 1<br>2 | IIIB | |
| 30 | 0411 | 0412 | 43.25<br>80 | 1.5<br>1.3 | 30 | 0 | 2<br>2 | IIIG | * Weak type I activity apparently from this region until $23^h30^m$. |
| 31 | 0106 | 0500 | 160 | 1.0 | 250 | ℓ | 1 | I | |

Days without Heliograph observations: .....15th.....

* Other type III's observed from same position during the day.

# COSMIC RAY INDICES
(Neutron Monitors)

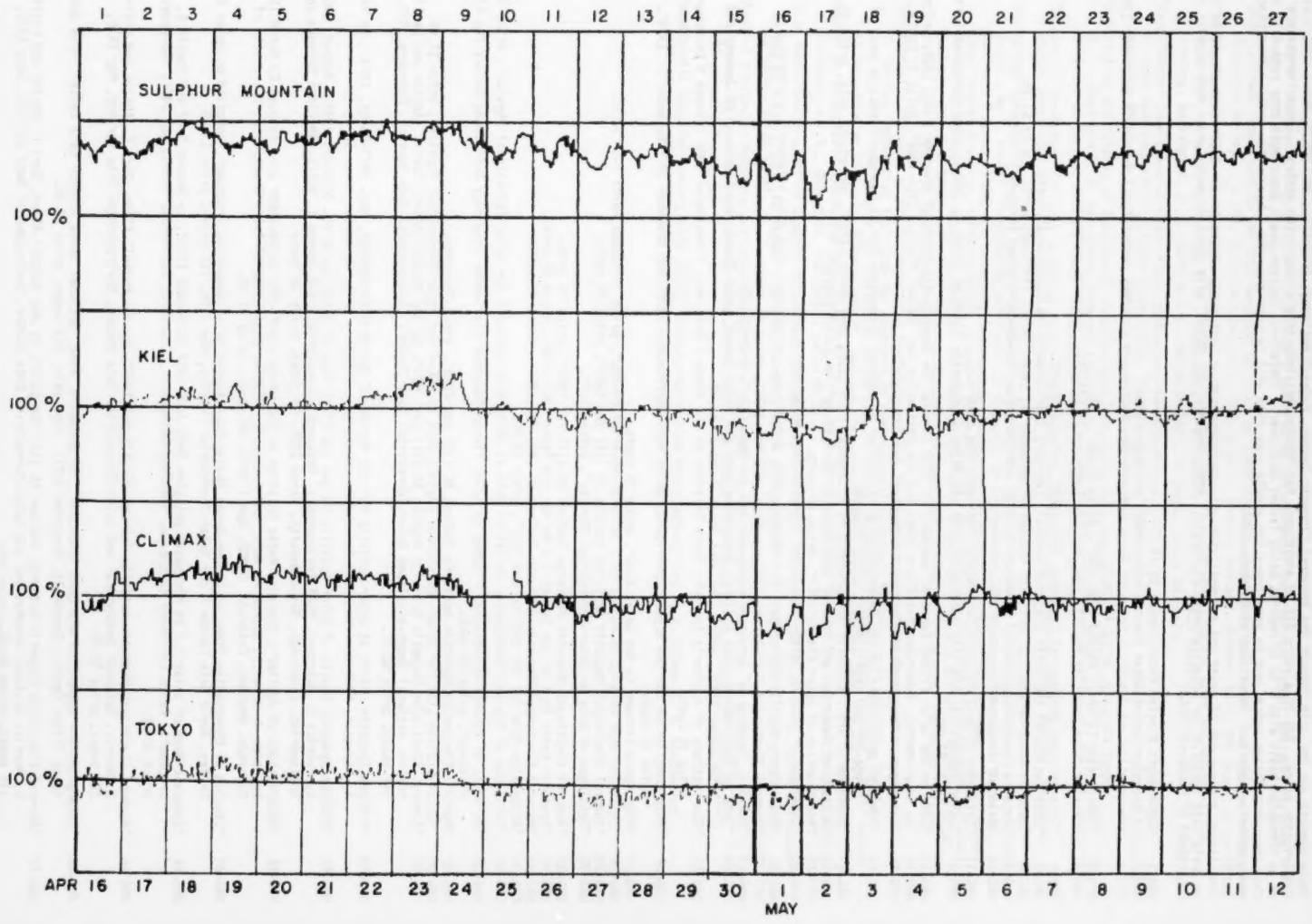
Bartel's Rotation 1964 (April 13–27, 1977)




COSMIC RAY INDICES

# COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1965 (April-May 1977)



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UAG-57 "Manual on Ionospheric Absorption Measurements", edited by K. Rawer, Institut für Physikalische Weltraumforschung, Freiburg, G.F.R., June 1976, 202 pages, price $4.27.

UAG-58 "ATS6 Radio Beacon Electron Content Measurements at Boulder, July 1974 - May 1975", by R. B. Fritz, Space Environment Laboratory (currently with Wave Propagation Laboratory), NOAA, Boulder, Colorado 80302 USA, September 1976, 61 pages, price $1.04.

UAG-59 "Auroral Electrojet Magnetic Activity Indices AE(11) for 1974", by Joe Haskell Allen, Carl C. Abston and Leslie D. Morris, National Geophysical and Solar-Terrestrial Data Center, Environmental Data Service, December 1976, 144 pages, price $2.16.

UAG-60 "Geomagnetic Data for January 1976 (AE(7) Indices and Stacked Magnetograms)" by J. H. Allen, C. A. Abston and L. R. Morris, NGSDC/EDS/NOAA, July 1977, 57 pages, price $1.07.

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